

Downwind Centrifugal Heater Installation and Operation

Model #: _____

Serial #: _____

Owner's Manual

PNEG-588-04

Date: **09-20-20**

GSI GROUP



PNEG-588-04

Check List

1. All wire connections
2. Spark plug gap 0.063 (1/16")
3. Pipe train tightness and gas leaks
4. Flame sensor tight
5. Fuse in place, extra fuse provided
6. Flame out light
7. Indicator light
8. Pressure gauge
9. Regulator adjusted
10. Shut off valve operates correctly
11. Vapor High-Limit
12. Unit cycles ON to OFF
13. Heat rise even across transition
14. Unit cycles HIGH to LOW (HIGH-LOW only)
15. Mod valve holds temperature within 1° (mod units only)
16. All decals and serial number tag
17. Aesthetic appearance
18. Manual

Tester Signature: _____

Date: _____

Personnel operating or working around this equipment should read this manual. This manual must be delivered with equipment to its owner. Failure to read this manual and its safety instructions is a misuse of the equipment. Any misuse of the equipment may void the warranty.

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1. Introduction

Thank you for choosing a GSI Group product. It is designed to give excellent performance and service for many years.

It is the plan of The GSI Group to improve its product whenever possible and practical to do so. We reserve the right to change, improve and modify products at any time without obligation to make changes, improvements and modifications on equipment sold previously.

Our foremost concern is your safety and the safety of others associated with this equipment. We want to keep you as a customer. This manual is to help you understand safe operating procedures and some problems which may be encountered by the operator and other personnel.

As owner and/or operator, it is your responsibility to know what requirements, hazards, and precautions exist and to inform all personnel associated with the equipment or in the area. Safety precautions may be required from the personnel. Avoid any alterations to the equipment. Such alterations may produce a very dangerous situation where SERIOUS INJURY or DEATH may occur.

This equipment shall be installed in accordance with the current installation codes and applicable regulations which should be carefully followed in all cases. Authorities having jurisdiction should be consulted before installations are made.

THIS MANUAL DESCRIBES THE OPERATION OF THE CENTRIFUGAL DOWNWIND HEATER DESIGNED FOR MEDIUM TO HIGH TEMPERATURE GRAIN CONDITIONING. ANY OTHER USE IS CONSIDERED A MISUSE OF THE PRODUCT.



This product has sharp edges, which may cause serious injury. To avoid injury, handle sharp edges with caution and always use proper protective clothing and equipment.

Safety Guidelines

This manual contains information that is important for you, the owner/operator, to know and understand. This information relates to protecting **personal safety** and **preventing equipment problems**. It is the responsibility of the owner/operator to inform anyone operating or working in the area of this equipment of these safety guidelines. To help you recognize this information, we use the symbols that are defined below. Please read the manual and pay attention to these sections. Failure to read this manual and its safety instructions is a misuse of the equipment and may lead to serious injury or death.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.



DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.



WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.




CAUTION, used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.



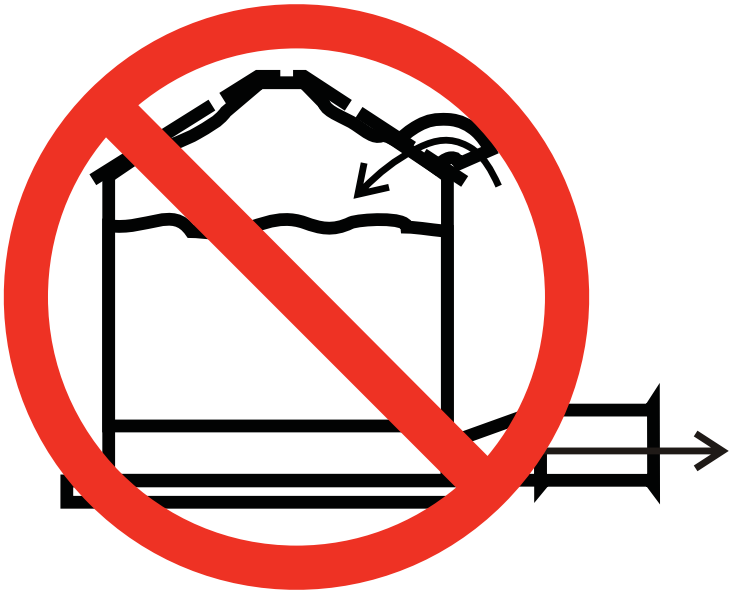
NOTICE is used to address practices not related to personal injury.

Roof Damage Warning and Disclaimer

The manufacturer does not warrant any roof damage caused by excessive vacuum or internal pressure from fans or other air moving systems. Adequate ventilation and/or “makeup air” devices should be provided for all powered air handling systems. The manufacturer does not recommend the use of downward flow systems (suction). Severe roof damage can result from any blockage of air passages. Running fans during high humidity/cold weather conditions can cause air exhaust or intake ports to freeze.



CAUTION



Excessive vacuum (or pressure) may damage roof. Use positive aeration system. Make sure all roof vents are open and unobstructed. Start roof fans when supply fans are started. Do not operate when conditions exist that may cause roof vent icing.

GSI Group, Inc. 217-226-4421DC-969

Safety decals should be read and understood by all people in the grain handling area. If a decal is damaged or is missing contact:

GSI Decals

1004 E. Illinois St.
 Assumption, IL. 62510
 Phone: 1-217-226-4421

A free replacement will be sent to you.

 <p>GSI Group 217-226-4421</p>	 WARNING
	<p>Stay clear of rotating blade. Blade could start automatically. Can cause serious injury. Disconnect power before servicing.</p> <p style="text-align: right;">DC-1225</p>

Part #: **DC-1225**
 Size: 4-7/8" x 2-1/4"
 Located above access door on heater housing.
(See Note Below.)

 <p>GSI Group 217-226-4421</p>	 WARNING
	<p>Flame and pressure beyond door. Do not operate with service door removed. Keep head and hands clear. Can cause serious injury.</p> <p style="text-align: right;">DC-1227</p>

Part #: **DC-1227**
 Size: 4-7/8" x 2-1/4"
 Located above access door on heater housing.
(See Note Below.)

NOTE: *May be substituted with DC-1559 combination decals.*

 <p>GSI Group Inc. 217-226-4421</p>	 DANGER
	<p>HIGH VOLTAGE Will cause injury or death. Lockout power before servicing.</p> <p style="text-align: right;">DC-889</p>

Part #: **DC-889**
 Size: 2.813" x 1.375"
 Located inside control box.

NOTICE		NOTICE
<p>Thermostat must be installed for operation.</p> <p>Failure to do so may damage equipment and cause fire.</p> <p>GSI Group 217-226-4421</p>		<p>Le thermostat doit être installé pour fonctionner.</p> <p>Omettre cette installation peut endommager l'équipement et provoquer un feu.</p> <p style="text-align: right;">DC-1702</p>

Part #: **DC-1702**
 Size: 1-1/2" x 3-1/4"
 Located on the outside of the control box lid.

3. Decals

High voltage.
Will cause serious injury or death.
Lockout power before servicing.

DC-1224

Part Number: **DC-1224**
 Size: 2-5/8" x 4-5/8"
 Located on the outside of the control box lid.

DC-113

Part #: **DC 113**
 Size: 4-3/4" x 1-5/8"
 Located above access door on heater housing.

Hi-Limit Reset Button

DC-108

Part #: **DC-108**
 Size: 1.0" x 2.0"
 Located in control box next to housing high-limit switch.

WARMER COLDER

VAPORIZER ADJUSTMENT

VAPORIZER COIL SHOULD BE ADJUSTED SO THAT VAPOR PIPE TRAIN IS WARM (100-125 DEGREES F) TO THE TOUCH.

DC-535

Part #: **DC-535**
 Size: 2-1/2" x 3.0"
 Located on the outside of the heater housing near the vaporizer coil on LP units.

DANGER
 HIGH VOLTAGE.
 Will cause injury or death.
 Lockout power before servicing.
 HAUTE TENSION.
 Causera des blessures ou la mort.
 Fermez le courant avant l'entretien.

Remove plug to reset high limit.
Enlevez le contact pour reinitialiser la limite élevée.

DC-1165

Part #: **DC 1165**
 Size: 3-1/4" x 3-1/4"
 Located on the outside of the transition high-limit assembly.

Heater Dimensions			
Model #	IH	IW	L
CHD-15	30-1/4"	19-1/2"	33.00"
CHD-30	33-1/4"	21-3/4"	33.00"
CHD-40	33-1/4"	23.69"	33.00"

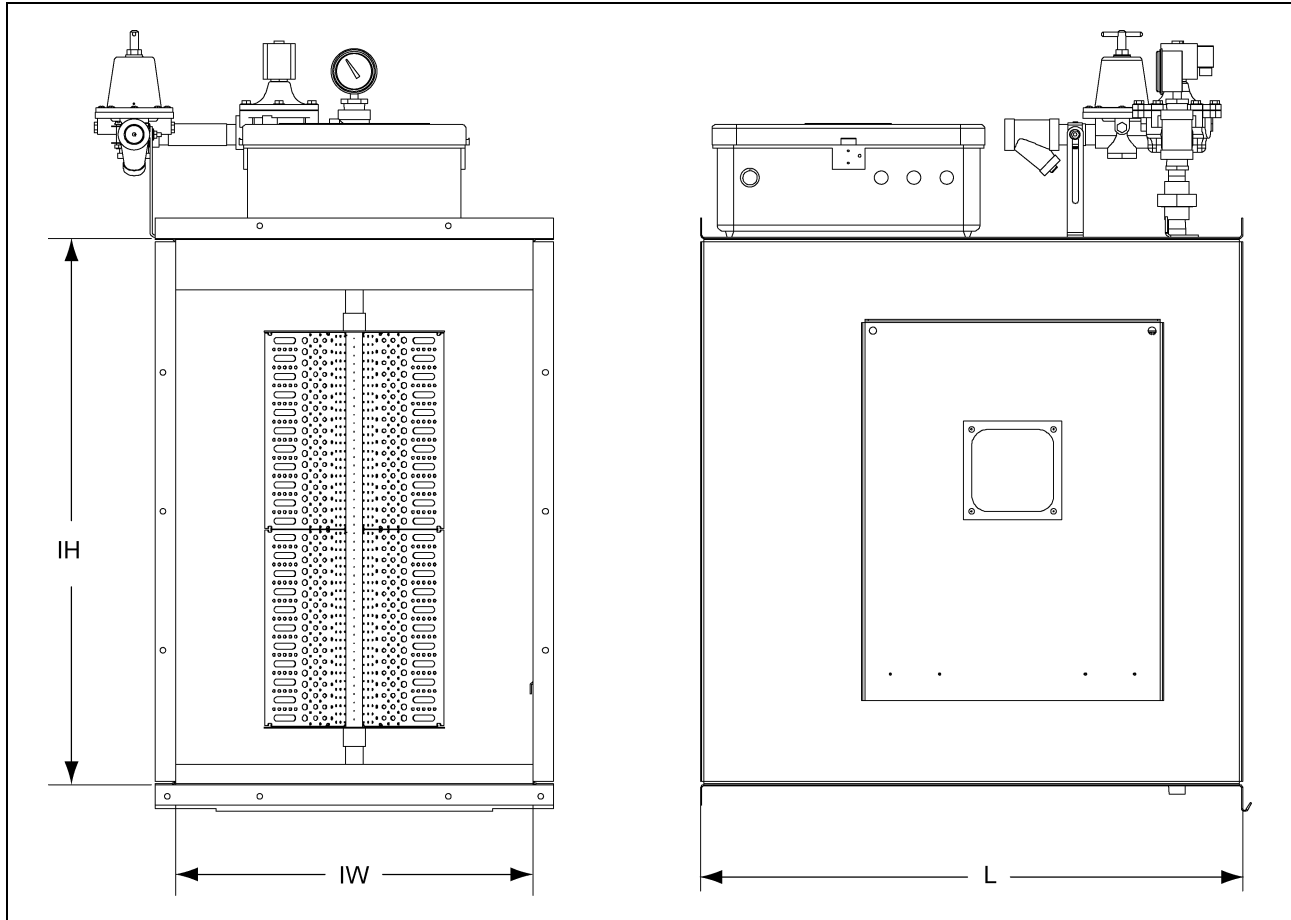


Figure 4A

4. Specifications

Fuel Specifications and Recommendations				
Model #		CHE-15	CHE-30	CHE-40
BTU Rating		2,300,000	3,300,000	4,200,000
Liquid Propane Models (LP)	Orifice Size	7/32"	17/64"	5/16"
	Operating Pressure Range, Heater Gauge Pressure (PSI) **	1-15	1-15	1-15
	Typical Maximum Fuel Flow (GPH) *	25	36	46
	Minimum Liquid Line Size	1/2"	1/2"	1/2"
Propane Vapor Models (VN)	Orifice Size	7/32"	17/64"	5/16"
	Operating Pressure Range, Heater Gauge Pressure (PSI) **	1-15	1-15	1-15
	Typical Maximum Fuel Flow (CFH) *	961	1379	1755
	Minimum Line Size, 100' Run	1.0"	1.0"	1-1/4"
	Minimum Pressure to Heater at Connection (PSI)	20	20	20
Natural Gas Models (VN)	Orifice Size	21/64"	25/64"	7/16"
	Operating Pressure Range, Heater Gauge Pressure (PSI) **	1-7	1-7	1-7
	Typical Maximum Vapor Fuel Flow (CFH) *	2212	3173	4038
	Minimum Line Size, 100' Run	1.0"	1.0"	1-1/4"
	Minimum Pressure to Heater at Connection (PSI)	10	10	10

* Maximum fuel flow rates listed assume full heat output for gas line sizing purposes. In normal operation, the fuel flow rates would be substantially lower than indicated, due to actual pressure setting used and cycling of the burner.

** The gas pressures listed show the operating limits for each model heater and are not necessarily the recommended operating pressure. The actual gas operating pressure should be within these limits, but will vary depending on the type of grain and the drying system. The maximum setting assumes ideal conditions of relatively low static pressure conditions with high fan airflow and good quality combustion. High static pressure conditions will require lower maximum gas pressure setting than specified.

Vertical Profile Angle Configuration

Vertical profile angles have been added to the Downwind Centrifugal Heaters to increase burner performance quality. These angles have been factory installed with the angle configuration of the smallest horsepower fan rated for the heater. As a result, some changes will be required at the time of installation once the fan and heater combination is known. This document describes the proper configurations of the vertical angles inside the heater housing.

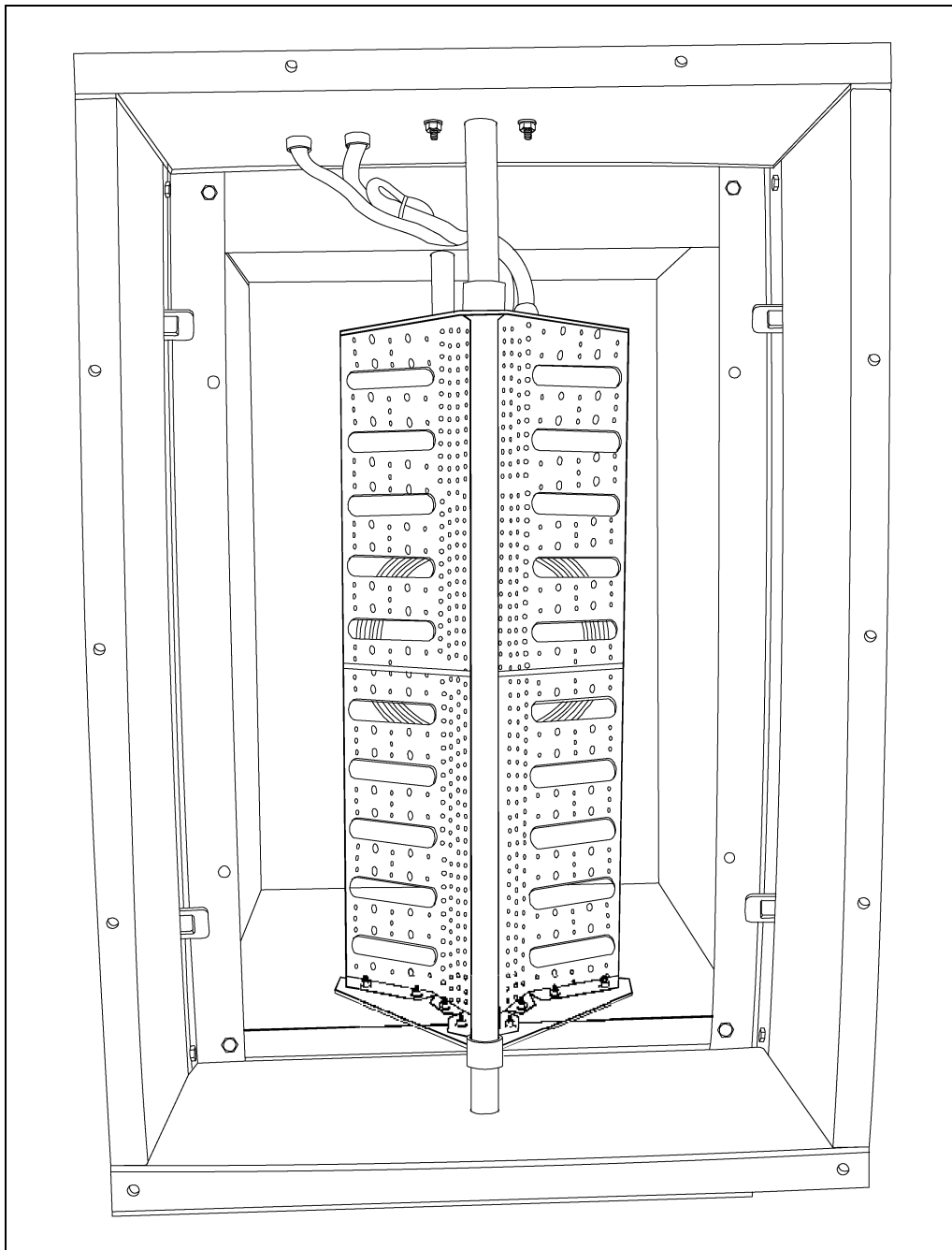


Figure 5A

IMPORTANT: Use of the vertical profile angles requires that the upper and lower profile angles have their 90° bend on the window side of the heater as shown in [Figure 5A](#).

5. Installation

CF-10 Centrifugal Fan and CHD-15 Model Heater

Figure 5B shows the factory configuration. No change is required to the heater.

Retrofit applications require holes to be drilled in the upper and lower profile angles and the vertical angle to be installed with the noted hardware.

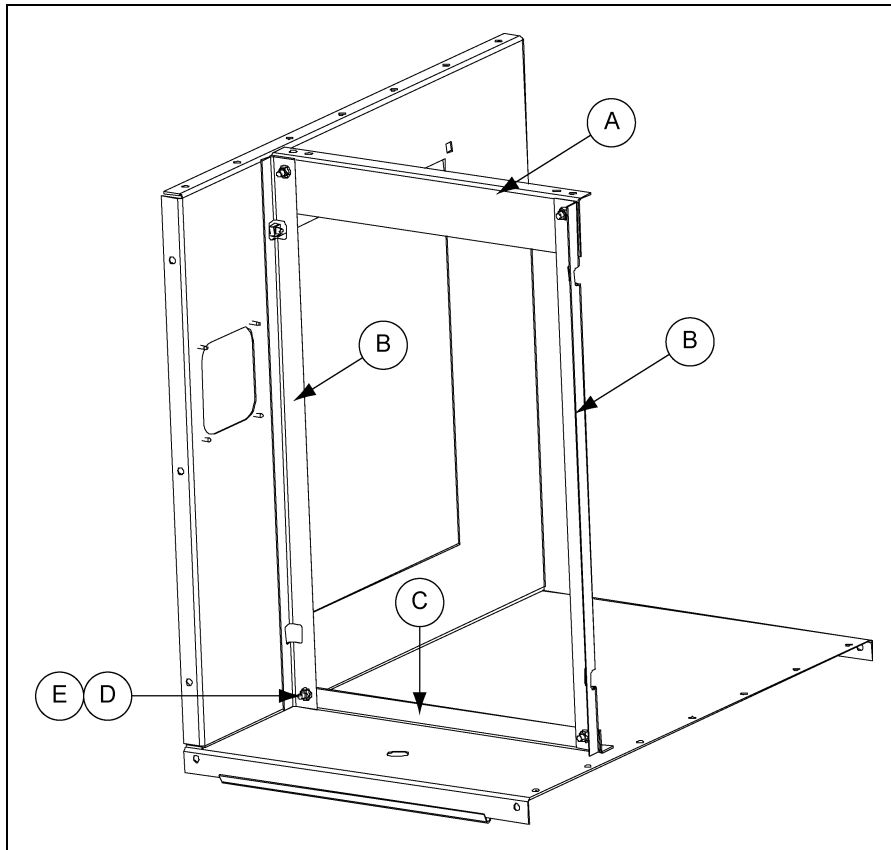


Figure 5B CHD-15 Heater

Ref #	Part #	Description
A		Upper Angle
B	HF-8076	Profile Angle - Side for CHD-15 (2)
C		Lower Angle
D	S-3611	Flange Nut 5/16"-18 YDP Grade 2 (4)
E	S-6606	Flange Bolt 5/16"-18 x 3/4" ZN Grade 5 (4)

CF-15 Centrifugal Fan and CHD-15 Model Heater

The vertical profile angles must be removed for correct operation of the heater.

CF-20 Centrifugal Fan and CHD-30 Model Heater

Figure 5C shows the factory configuration for the 20 HP application. Here the long leg of the angle points toward the center of the heater to provide a 17" wide opening across the housing at the location of the angles. No change is required to the heater.

Retrofit applications require holes to be drilled in the upper and lower profile angles and the vertical profile angles to be installed with the noted hardware.

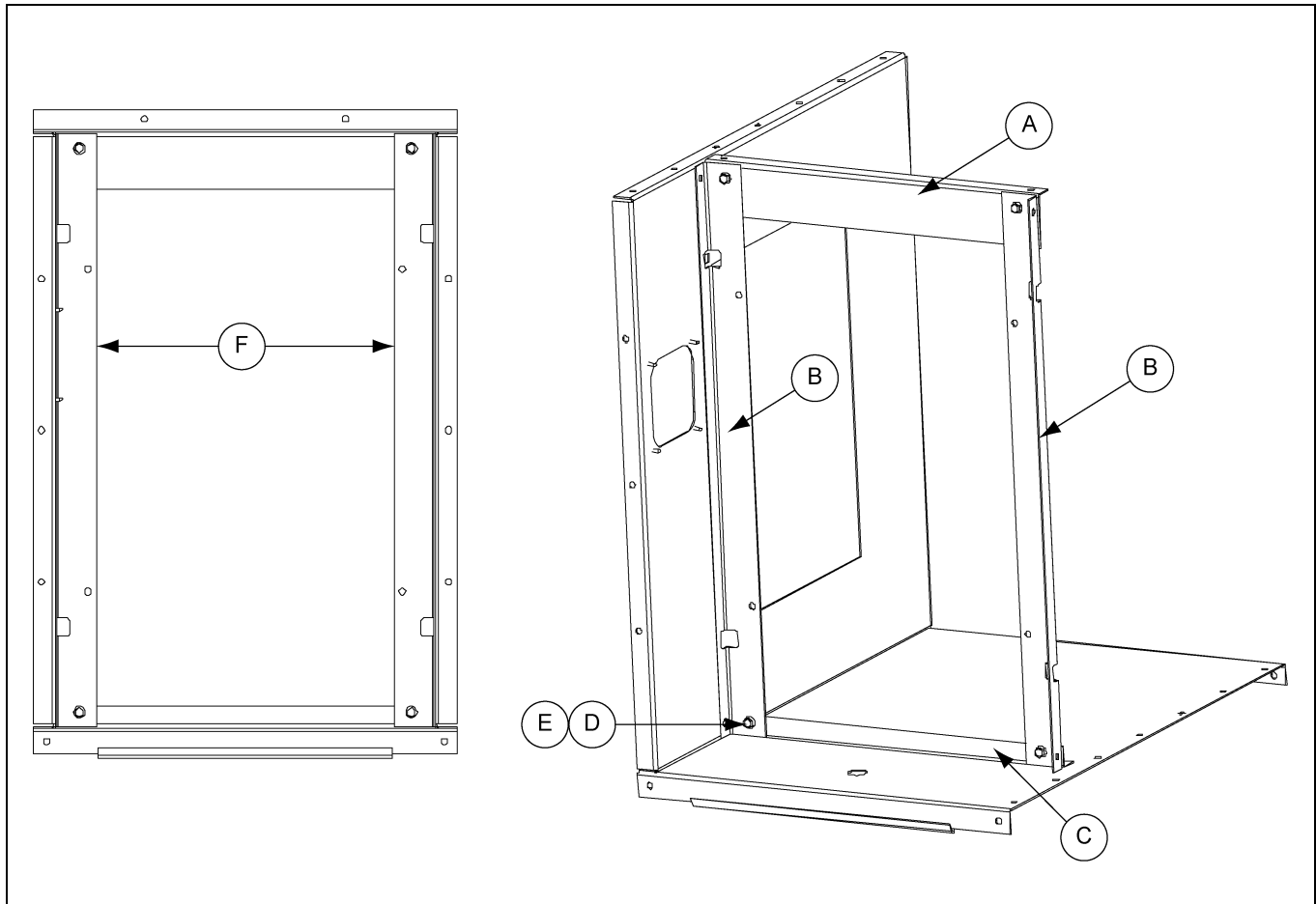


Figure 5C CHD-30 Heater for CF-20 Fan

Ref #	Part #	Description
A		Upper Angle
B	HF-8071	Profile Angle - Side for CHD-30 (2)
C		Lower Angle
D	S-3611	Flange Nut 5/16"-18 YDP Grade 2 (4)
E	S-6606	Flange Bolt 5/16"-18 x 3/4" ZN Grade 5 (4)
F		17"

5. Installation

CF-25 Centrifugal Fan and CHD-30 Model Heater

Figure 5D shows the configuration for the 25 HP application. The vertical profile angles must be repositioned. Flip each angle end for end and install it with the short leg of the angle pointing toward the center of the heater. This provides a 19-1/2" wide opening across the heater housing at the location of the angles.

Retrofit applications require holes to be drilled in the upper and lower profile angles and the vertical profile angles to be installed with the noted hardware.

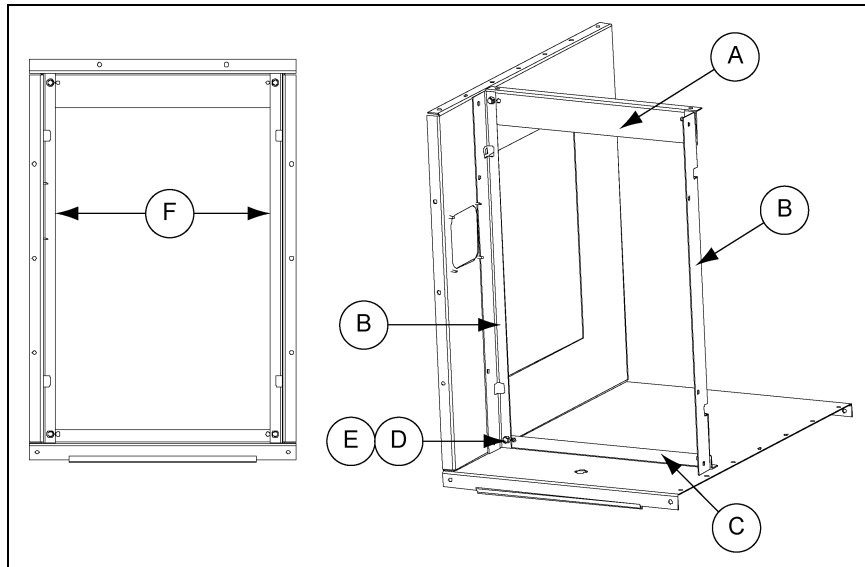


Figure 5D CHD-30 Heater for CF-25 Fan

Ref #	Part #	Description
A		Upper Angle
B	HF-8071	Profile Angle - Side for CHD-30 (2)
C		Lower Angle
D	S-3611	Flange Nut 5/16"-18 YDP Grade 2 (4)
E	S-6606	Flange Bolt 5/16"-18 x 3/4" ZN Grade 5 (4)
F		19-1/2"

CF-30 Centrifugal Fan and CHD-30 Model Heater

The vertical profile angles must be removed for correct operation of the heater.

Deluxe Heater Electrical Installation



Always disconnect and lock out power before working on or around heater.

Standard electrical safety practices and codes should be used when working with a heater. Refer to the National Electric Code Standard handbook by the National Fire Protection Association. *A qualified electrician should make all wiring installations.*



Heater must be interlocked with fan for safe operation.

Heater Power Connection

1. Connect power cord to fan control box.
2. Make field connections in fan box as shown in *Figure 5E*.
3. Connect deluxe thermostat control as shown in *Figure 5E*.

NOTE: Heater control is 120V only.



Thermostat must be installed for safe operation.

Heater power is 120 VAC. Damage will occur if connected to high voltage power source.

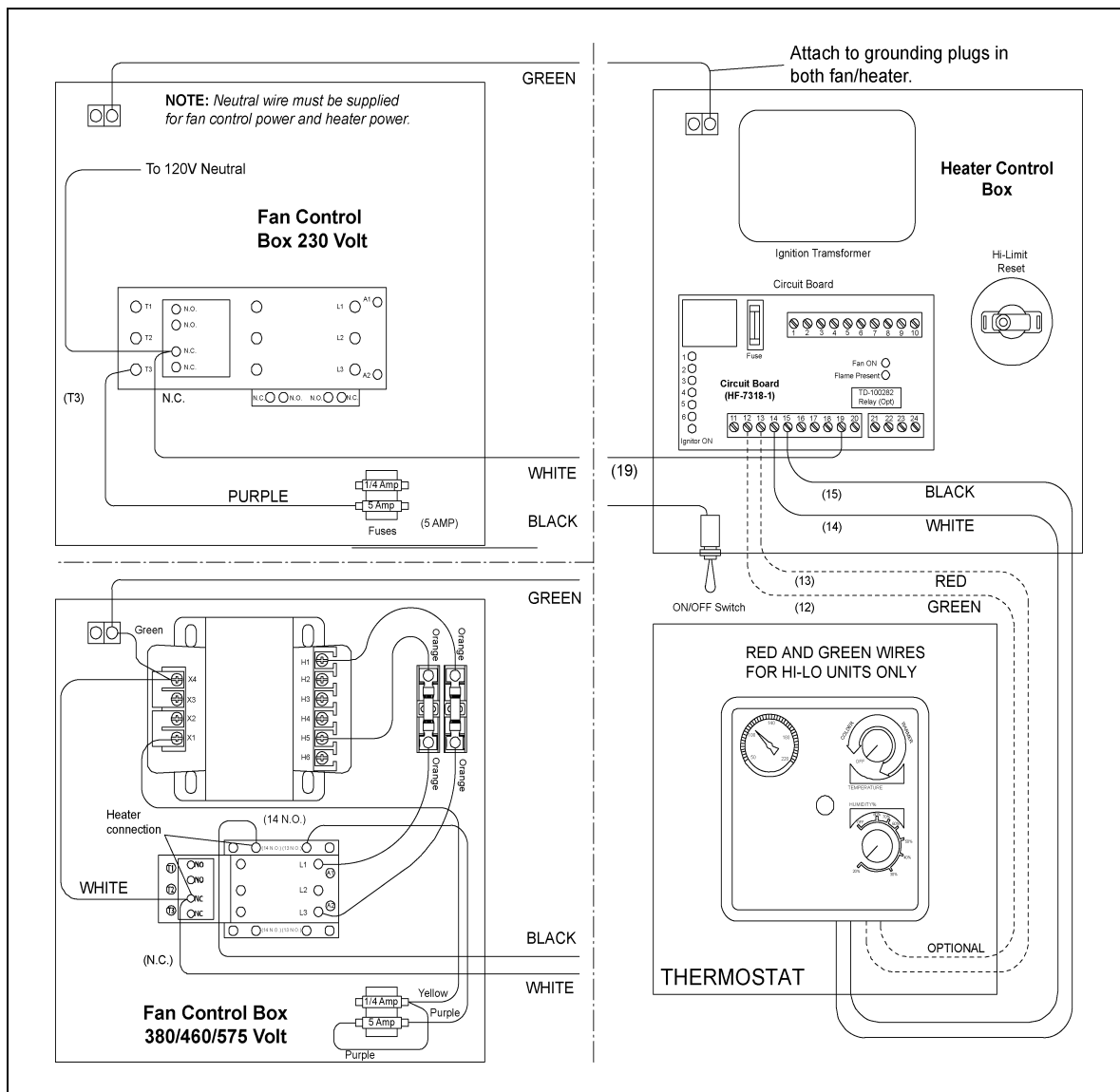


Figure 5E

5. Installation

Deluxe Heater - Second Heater Installation

For Deluxe Units Using HF-7318-1 Control Board

Two (2) Deluxe Heaters may be connected to one grain drying system and wired so they cycle together. One of the heaters should have a thermostat connected to it as per the installation instructions. That heater will be referred to as the master. The other heater (without the thermostat) will be referred to as the slave.

Installation for ON/OFF Units

1. Install relay base (TD-100283) in master heater control box.
2. Connect wire between terminal 6 on circuit board and terminal 14 on relay base in master heater.
3. Connect wire between terminal 13 on relay base and terminal 8 on circuit board in master heater.
4. Run two (2) wires (18 gauge) between master and slave heaters.
5. Connect wires to terminal 5 and 9 (points A and B) on relay base in master heater.
6. Connect wire from terminal 9 in master to terminal 14 (point F) in slave unit.
7. Connect wire from terminal 5 in master to terminal 15 (point E) in slave unit.
8. Install relay (TD-100282) in relay base.

Additional Steps for High-Low Units

1. Run two (2) wires (18 gauge) between master and slave unit.
2. Connect wires to terminals 21 and 22 (points C and D) on circuit board in main heater.
3. Connect wire from terminal 21 in master to terminal 12 (point H) in slave unit.
4. Connect wire from terminal 22 in master to terminal 13 (point G) in slave unit.
5. Install relay (TD-100282) in relay base.

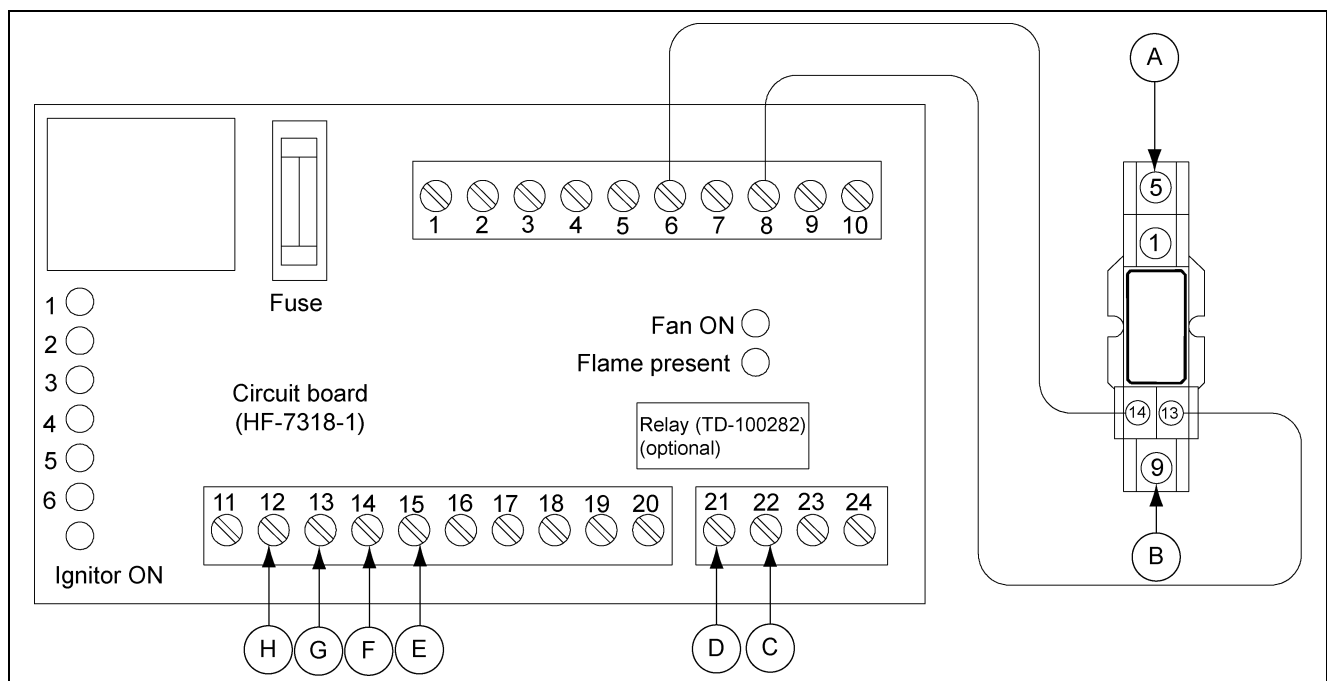


Figure 5F The Control Board (HF-7318-1)

Fuel Connection



Do not use propane tanks which have previously been used for ammonia unless they have been purged according to procedures of the national LP association.

Investigate to be sure that the fuel supply system complies with all local codes for LP gas installations.

Liquid Propane Models

1. LP models are designed to run on liquid propane, with liquid draw from the propane tank. Avoid using propane supply tanks that have been use for vapor draw for long periods of time. When using liquid draw systems any moisture that may be present in tank or lines may freeze when system is used in cold weather. To avoid this, the usual precaution is to purge the system with methanol.
2. Run proper size line ([See Specifications on Page 9](#)) to pipe train on heater. Have a qualified gas service person inspect installation to be sure everything is installed according to local codes and ordinances.
3. After installation is complete, check all connections for leaks. Use liquid detergent or comparable substance. Wear rubber gloves and eye protection. Avoid contact with liquid propane.



Do not use flame for leak testing.

Propane Vapor Models

1. Propane vapor models are designed to run directly off of supply tank or from a separate external vaporizer.
2. Run proper size line ([See Specifications on Page 9](#)) to pipe train on heater. Have a qualified gas service person inspect installation to be sure everything is installed according to local codes and ordinances.
3. After installation is complete, check all connections for leaks.

Natural Gas Models

1. Natural gas models are similar to vapor models, but have a larger orifice to accommodate lower pressure, sometimes found with natural gas.
2. Run proper size line ([See Specifications on Page 9](#)) to pipe train on heater. Have a qualified gas service person inspect installation to be sure everything is installed according to local codes and ordinances.
3. After installation is complete, check all connections for leaks.

Bin Configuration

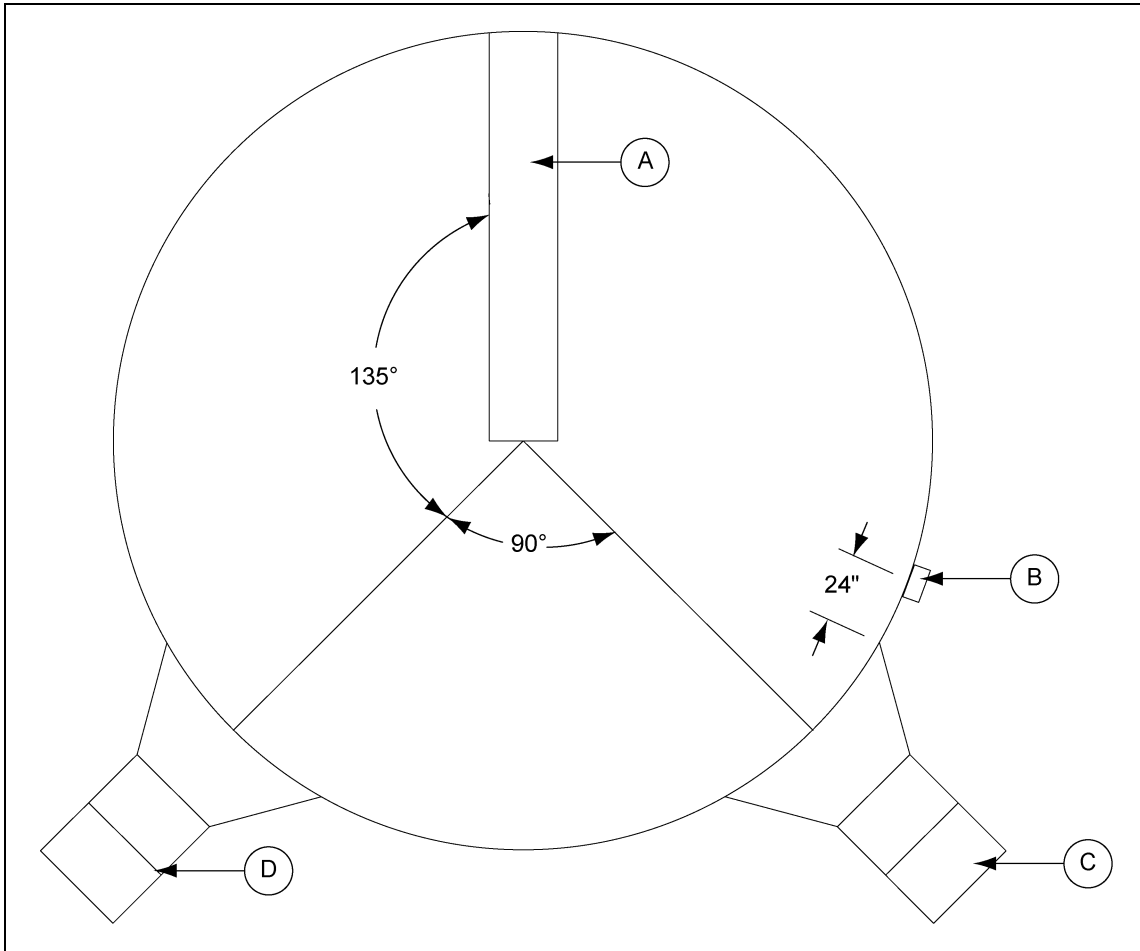


Figure 5G

Ref #	Description
A	Unload Auger
B	Plenum Thermostat
C	Master Heater
D	Slave Heater

IMPORTANT: When mounting two (2) heaters on a bin it is imperative that they be situated as shown in [Figure 5G](#). Plenum thermostat must be to the right of master heater and master heater must be to the right of slave heater.

Transition High-Limit Installation

1. Mark location on transition one foot up from the bottom (entrance collar) and centered in the transition.
2. Drill or knock out 7/8" diameter hole on marked location.
3. Install transition high-limit using supplied self-drilling screws.

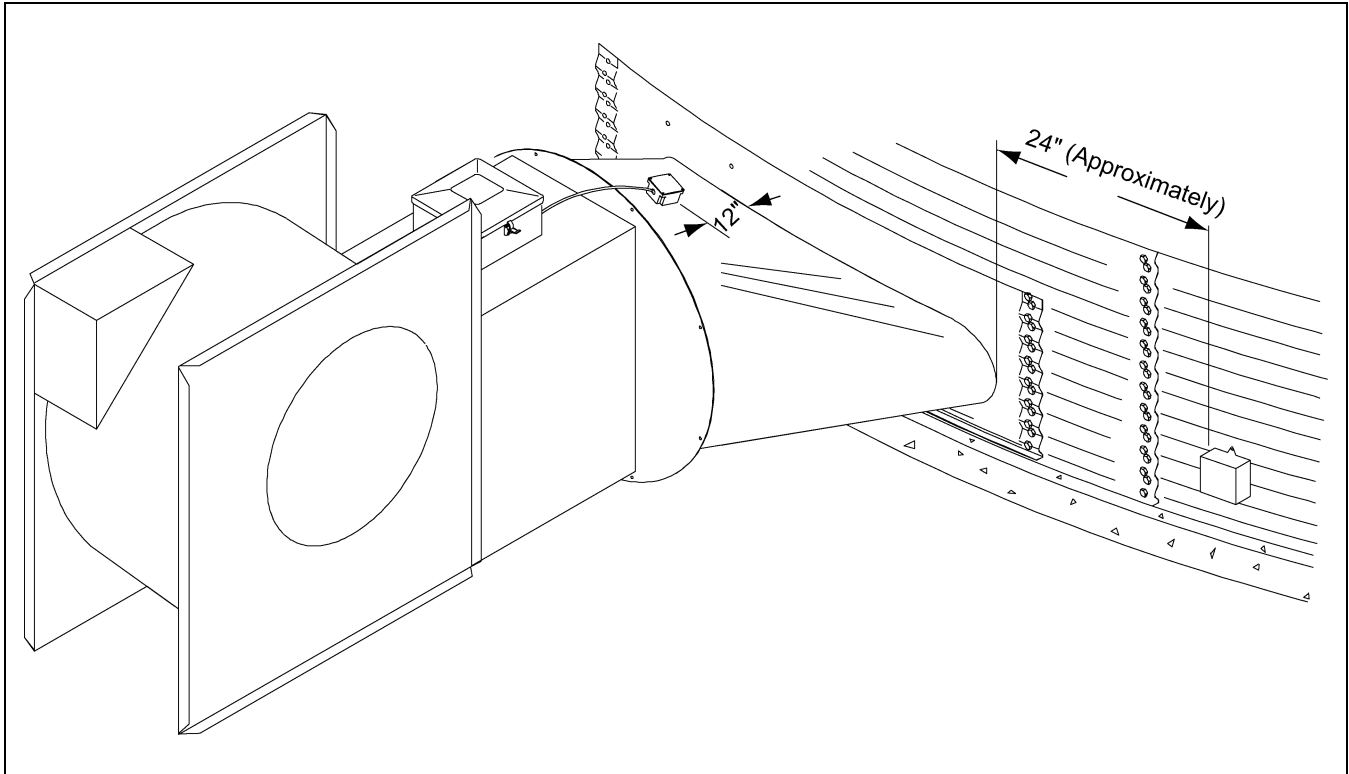


Figure 5H *Sensor placement on transition connecting heater to the bin.*

5. Installation

Plenum Thermostat Installation

The plenum thermostat must be ordered separately from the heater unit.

1. Follow installation instructions provided with the thermostat assembly.
2. Position the housing so that the bolt flanges are vertical and the cord exits the housing from the bottom. Mark position.
3. Use six (6) (4.00") or eight (8) (2.66") self-drilling screws to mount the housing to the bin sidewall. **DO NOT TIGHTEN COMPLETELY.** Insert corrugation seal into gap between housing and sidewall. Tighten screws.
4. Caulk between the housing and the sidewall to seal.



Thermostat must be installed to operate as plenum high-limit safety.

Heater control device (thermostat or humidistat) is required for heater warranty on all heaters.

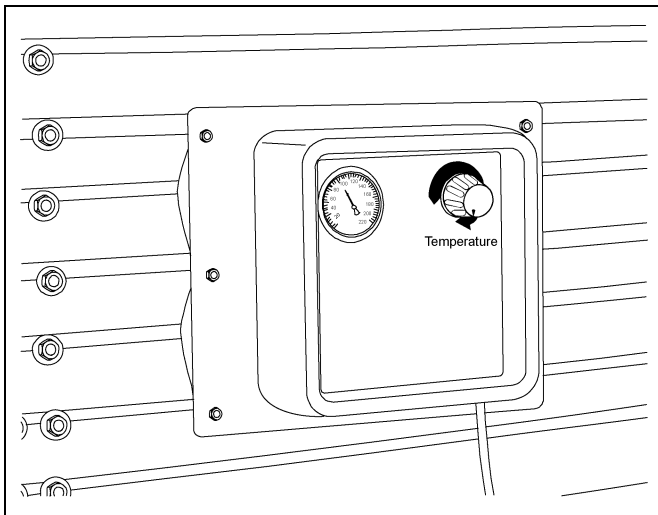


Figure 5I *Plenum thermostat mounted on bin wall.*

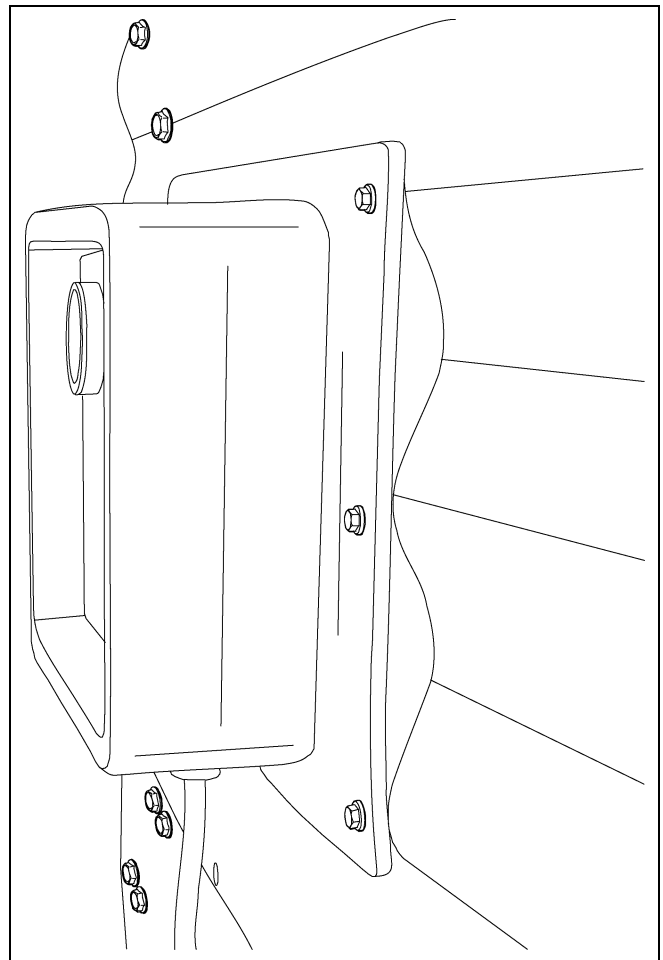


Figure 5J *Side view of thermostat showing corrugation seal.*

Operating Temperature Table

NOTE: *This table is not intended as a drying guide. It should be used as a reference for setting maximum plenum temperature for safe operation.*

Grain	Low Temperature Batch	High Temperature Batch Dry No Stirring	High Temperature with Stirring	Continuous Flow (Recirculating)
Corn	5-20° Above Ambient Temperature	120°	140°	140°
Rice	5-10° Above Ambient Temperature	100°	100°	Not Recommended
Beans and Wheat	5-20° Above Ambient Temperature	110°	120°	Not Recommended



Do not exceed plenum temperatures listed in table



Do not operate above rated maximum BTU output. Fire damage to grain product and drying structure will occur. Refer to burner specifications for maximum BTU.

Cycling Heater Operation

1. Thermostat must be wired into heater control box for heater to operate.
2. Open all manual shut off valves to heater unit.
3. Start fan. This will supply power to heater.
4. Turn thermostat dial to its highest setting.
5. Turn toggle switch ON.
6. Heater should now be lit. If not check to see that all gas is ON.
7. Watch thermometer on plenum and when it reaches desired temperature turn thermostat back slowly until heater cycles OFF.
8. Gas pressure should be adjusted, so burner is on 75% of the time.
9. Watch plenum temperature as burner goes through a few cycles, to be sure that it is operating properly.

6. Operation

High-Low Heater Operation

1. High-limit and cycling thermostat must be wired into heater control box for heater to operate.
2. Open all manual shut off valves to heater unit.
3. Start fan. This will supply power to heater.
4. Turn thermostat dial to its highest setting.
5. Turn toggle switch ON. Both indicator lights should illuminate indicating power to the control circuit.
6. Heater should now be lit. If not check to see that all gas is ON.
7. Loosen the retaining nut holding bypass valve screw in place. Open the bypass valve all the way.
8. Turn thermostat dial back slowly until heater cycles to low flame.
9. Adjust bypass valve so that low-flame pressure is at desired setting. (As low as possible.)
10. Turn thermostat dial to desired setting and wait for bin plenum to come up to temperature. Heater should cycle to low flame after a few minutes.
11. If heater does not cycle to low flame increase high flame gas pressure by adjusting the regulator.
12. High flame should be adjusted, so the heater cycles at least once a minute. Low flame should be adjusted so there is enough flame for unit to keep operating.
13. Watch as burner goes through a few cycles, to be sure that it is operating properly back to high flame.

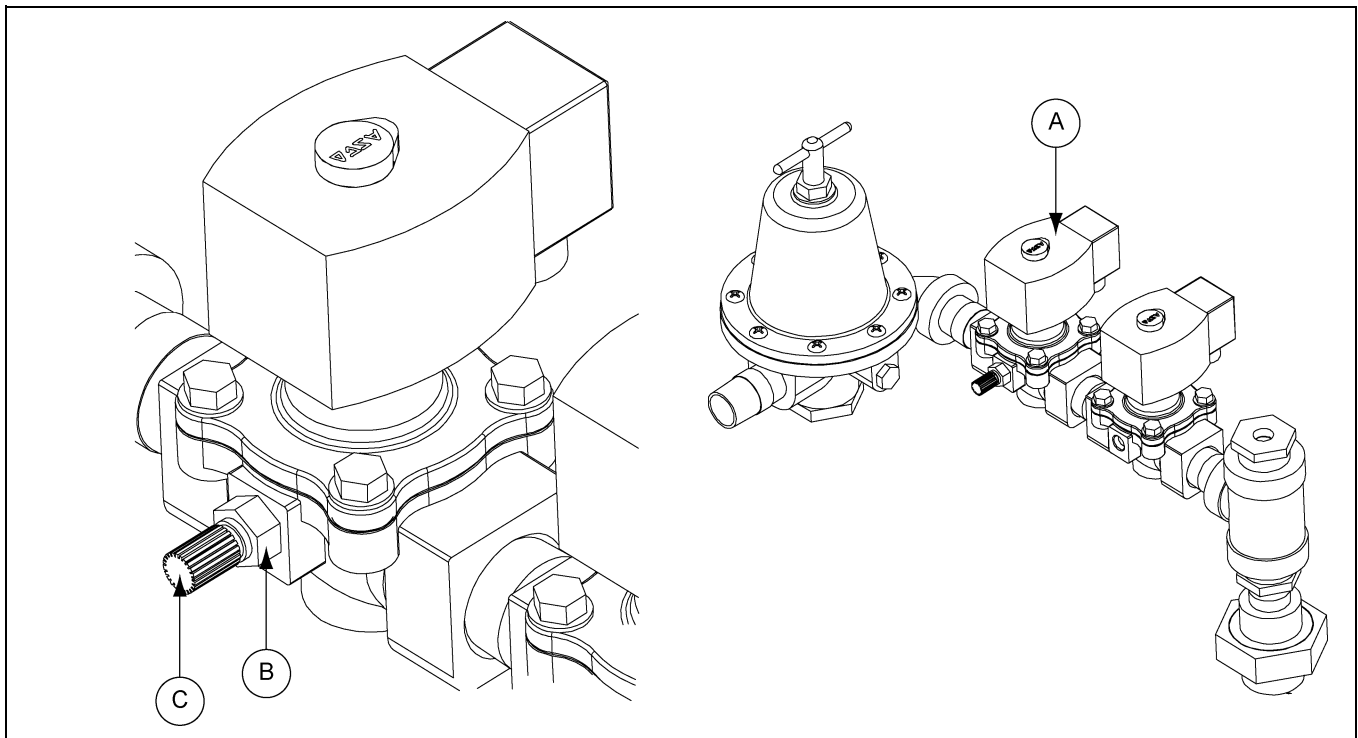


Figure 6A

Ref #	Description
A	Bypass Valve
B	Retaining Nut
C	Bypass Valve Screw

Modulating Valve Operation

1. The modulating valve regulates gas flow through the heater based on sensing unit in the plenum and maintains a constant drying air temperature.
2. The sensing bulb of the modulating valve should be mounted through the bin wall with the side reading “top” up. The bulb reacts to temperature. It changes the amount of gas (increase or decrease), burning warmer or cooler depending on the position of the valve SET POINT. If the bulb is cooler than it was at the SET POINT, the bulb senses the cooler temperature and opens the valve further so more heat is applied to the drying air. If the bulb is warmer than it was at the SET POINT, the valve closes further and reduces the temperature until the air is at the valve SET POINT.
3. It is important that the pressure regulator be set high enough to allow the modulating valve to deliver enough gas to maintain the plenum temperature necessary. The regulator is normally factory set at 15 PSI (propane units). To set the regulator, run the heater and turn the modulating valve T-handle in. This gets full line pressure to the burner. Then adjust regulator to read 15 PSI (depending on the plenum temperature needed).
4. Turn the fan and heater ON. To set the modulating valve, turn the T-handle out (counterclockwise) until loose and wait a few minutes for the plenum temperature to equalize. When the temperature under the bin has equalized, gradually turn T-handle in (clockwise) about 1/2 turn at a time. Wait until temperature under bin has equalized as before. If temperature under bin is less than the desired temperature, continue turning T-handle in, increasing gas flow and waiting for plenum temperature to equalize until the desired temperature is the stable temperature of the plenum. If temperature under bin is the same 10 minutes after you last made any adjustments to the T-handle you can be certain that the temperature under the bin is the SET POINT of the valve. **1 Turn of the T-handle equals approximately 7°F of temperature.**
5. The valve will now keep the plenum temperature at the set point regardless of ambient conditions as long as humidistat or thermostat do not shut down the heater. A bypass orifice is used to maintain a small flame when outside temperature is near or above the set point of the valve. The bypass insures steady application of heat at minimum gas flow operation. By pass orifice will only operate correctly if pressure regulator is set correctly.
6. To observe how the modulating valve increases the efficiency of bin drying, check the gas pressure of the unit in the morning and compare to the pressure read mid-afternoon. If the ambient (outside) temperature is significantly greater later in the day (as normal), the gas pressure will be less. Since less heat is required to maintain the same temperature in the plenum, the modulating valve will have reduced the amount of gas used by the heater.

6. Operation

BTU per Gauge Pressure - Propane

BTU Per Gauge Pressure - Propane (Approximate)			
Gauge Pressure (PSI)	10-15	20-30	40-50
1	576,713	847,122	1,174,963
2	816,013	1,203,679	1,663,135
3	997,881	1,469,302	2,034,050
4	1,148,640	1,694,244	2,345,140
5	1,287,434	1,895,256	2,622,728
6	1,409,477	2,077,124	2,878,779
7	1,524,341	2,244,634	3,108,507
8	1,632,026	2,404,965	3,328,663
9	1,725,353	2,541,366	3,520,103
10	1,825,859	2,687,339	3,721,115
11	1,995,762	2,938,604	4,068,100
12	2,153,700	3,173,118	4,393,548
13	2,227,883	3,280,803	4,541,914

Gauge Pressure Required to Maintain Temperature Rise - Propane

Gauge Pressure (PSI) Required to Maintain Temperature Rise (Approximate) Propane - High Temperature Units Only						
Fan Model	Static Pressure (Inches)	Heat Rise °F				
		60	80	100	120	140
10	2	2	4	6	8	11
	4	2	3	5	6	9
	6	2	2	3	5	6
15	2	3	6	9	11	
	4	3	5	7	10	13
	6	2	3	5	7	9
20	2	3	4	6	9	11
	4	2	4	5	7	10
	6	2	3	4	6	8
25	2	4	6	9	13	
	4	3	5	8	11	15
	6	3	4	6	9	11
30	2	4	7	10	15	
	4	4	6	9	13	
	6	3	5	8	11	15
40	2	3	6	9	11	
	4	3	5	8	11	13
	6	3	4	7	9	13
50	2	4	6	9	13	
	4	3	5	8	11	15
	6	3	5	7	10	13

BTU per Gauge Pressure - Natural Gas

BTU Per Gauge Pressure - Natural Gas (Approximate)			
Gauge Pressure (PSI)	10-15	20-30	40-50
1	893,360	1,264,640	1,587,040
2	1,266,720	1,794,000	2,250,560
3	1,548,560	2,192,320	2,750,800
4	1,785,680	2,529,280	3,173,040
5	1,996,800	2,827,760	3,548,480
6	2,191,280	3,102,320	3,891,680
7	2,367,040	3,351,920	4,204,720

Gauge Pressure Required to Maintain Temperature Rise - Natural Gas

Gauge Pressure (PSI) Required to Maintain Temperature Rise (Approximate) Natural Gas - High Temperature Units Only						
Fan Model	Static Pressure (Inches)	Heat Rise °F				
		60	80	100	120	140
10	2	1	2	3	4	5
	4	1	2	2	3	4
	6	1	1	2	2	3
15	2	2	3	4	5	7
	4	1	2	3	4	6
	6	1	2	2	3	4
20	2	1	2	3	4	5
	4	1	2	3	4	5
	6	1	2	2	3	4
25	2	2	3	4	6	
	4	2	3	4	5	7
	6	1	2	3	4	6
30	2	2	3	5	7	
	4	2	3	4	6	
	6	2	3	4	5	7
40	2	2	3	5	7	
	4	2	3	4	6	
	6	2	3	4	5	7
50	2	2	4	5	7	
	4	2	3	5	6	
	6	2	3	4	5	7

6. Operation

Adjusting the Vaporizer

1. Vaporizer should be adjusted so the vapor pipe train runs warm to the touch (100°-120°F).
2. Loosen 5/16" pivot bolts on adjustment bracket.
3. Tilt vaporizer away from burner to cool. Tilt toward burner to heat. Vaporizer may be raised or lowered for vertical adjustments.
4. Tighten 5/16" pivot bolts to fix vaporizer position.

IMPORTANT: Only move vaporizer 1" at a time. Allow heater to run a few minutes for temperature to equalize.

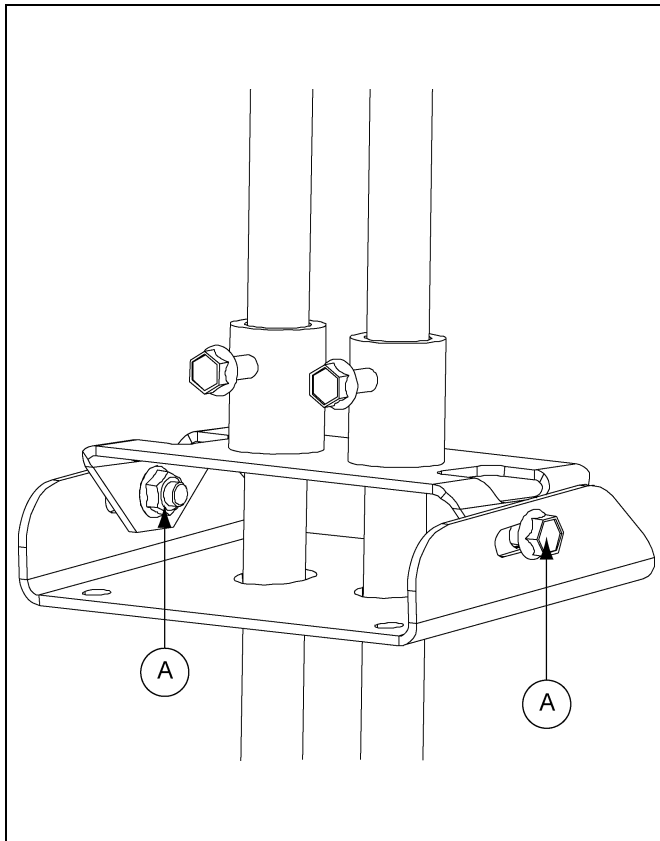


Figure 6B

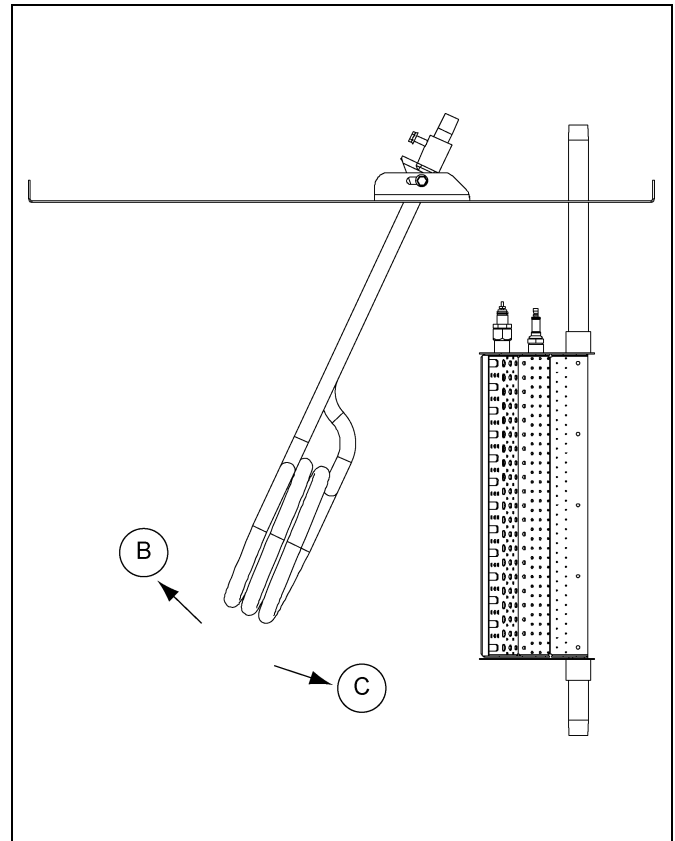


Figure 6C

Ref #	Description
A	Pivot Bolts
B	Cooler
C	Warmer

Vaporizer adjustment: Away from burner to cool. Toward burner to heat.

Seasonal Inspection and Service

All parts are made of weather-proof construction and are designed to require a minimum of service; however, we recommend the following items be checked and serviced, as described, before the unit is used each season. Replace any damaged or questionable parts.

THESE CHECKS WILL HELP ELIMINATE POSSIBLE MINOR FAULTS AND ASSURE DEPENDABLE OPERATION OF THE EQUIPMENT WHEN IT IS NEEDED.

1. Check fan and service it as described within the fan installation and operation manual.
2. Shut off electrical power. Remove heater control box cover and inspect for moisture, rodent damage or accumulated foreign material remove any foreign material present. **INSPECT AND TIGHTEN ALL LOOSE TERMINAL CONNECTIONS.** Replace any damaged or deteriorated wiring.
3. Shut off fuel and remove and clean gas line strainer.
4. Remove the orifice from the burner venturi and inspect for obstructions. Also, inspect and clean out the burner venturi and the ports within the burner cup. Blow out with compressed air or disassemble and thoroughly clean these parts. Foreign material in the venturi or burner cup will impair heater operation and cannot be expected to burn out when the heater is started.
5. Inspect and clean the electrodes on the ignitor plug. Use an ignition point file to remove carbon and rust between the electrode surfaces.
6. Inspect flame rod and ignitor plug wires for possible damage or poor connections.
7. After completing all checks and performing any necessary service, check the control device, as described under the following appropriate heading.

Heaters Equipped with a Humidistat Control

Temporarily remove humidistat control from air plenum chamber of bin. Rotate the knob through the 20% to 80% humidity range. The switch within the humidistat should produce a small “click” when the lever passes the point of prevailing humidity.

NOTE: For additional information, refer to instructions that accompanied the humidistat.

Heaters Equipped with a Thermostat Control

Slowly rotate the thermostat dial through its temperature range. The switch within the thermostat should produce a small “click” when the dial passes the point of prevailing temperature. Set the dial to a setting at least 10°F above the prevailing temperature and proceed to the next step.

8. Test operate the fan and heater. Make sure to follow operating instructions, **INCLUDING.** After fan starts operating and the heater purge interval has elapsed (approximately 20 seconds delay), the heater should come ON and start operating.
9. Slowly change the humidistat or thermostat setting and cycle the heater OFF and ON to make sure the device is controlling the heater and is operating properly.

7. Service

10. **LP MODELS ONLY** - After heater has been operating for some time and temperatures have stabilized, check temperature of the gas line between outlet side of vaporizer and the gas regulator.

If gas line becomes “frosted” with an accumulation of ice build-up, adjust vaporizer slightly closer to the flame. If line reaches a high temperature where it is hot to the touch, adjust vaporizer further away from the flame.

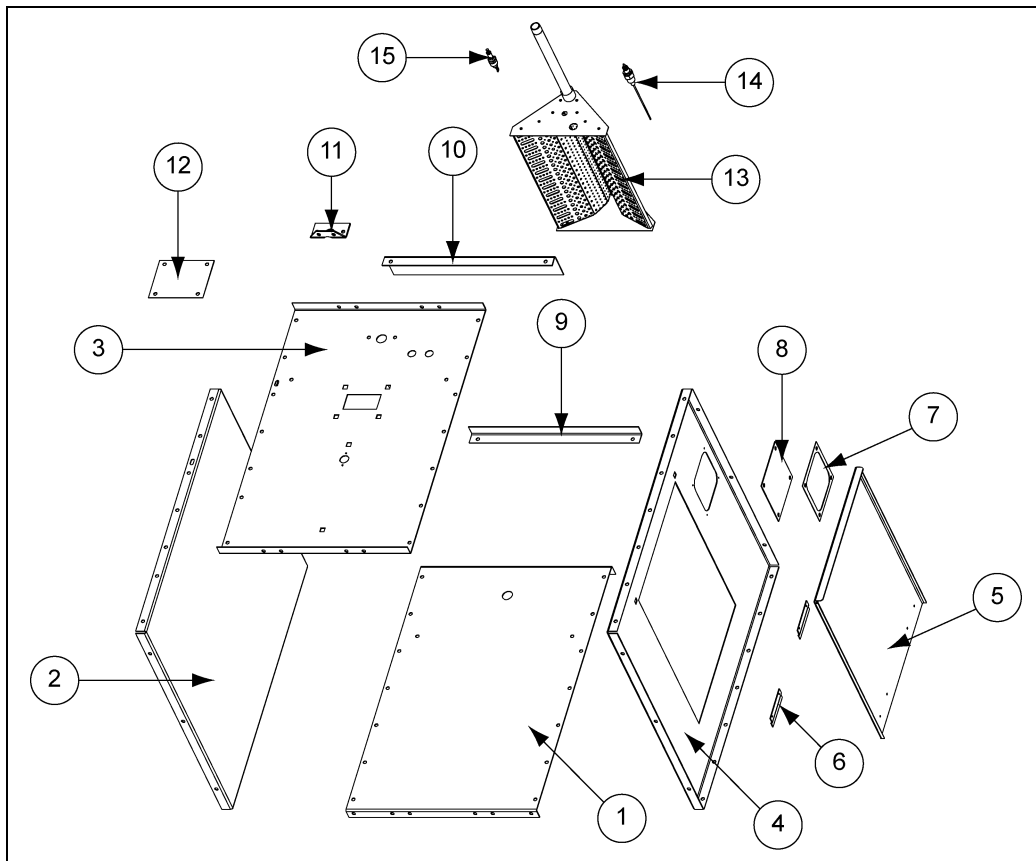
NOTE: *If gas temperature exceeds approximately 220°F, the vapor high-limit thermostat will open the electrical circuit to the liquid gas solenoid valve and shut off fuel flow to stop the heater. This condition can be verified by temporarily connecting a jumper wire across the connections of the high-limit and observing that the burner re-lights. If high-limit vapor thermostat causes the burner to stop operating, it may also cause the burner to go into a safety lock out condition. Refer to heater operating instructions for restarting procedure.*

11. Vaporizers should be inspected and serviced prior to each season of operation, including the following:
- Carefully inspect the surfaces of the vaporizer coil and the inlet and vapor outlet pipes for evidence of severe corrosion or abrasion of metal which could cause subsequent leakage of liquid propane, gross overheating and fire hazard.
 - Insecure mounting of either the vaporizer or burner, due to loosened bolts, can cause interference between burner vanes and vaporizer pipes, with the natural vibration of the unit causing erosion of the pipe metal at the point of maintained contact.
 - If there has been significant abrasion of the steel vaporizer pipe, it must be replaced.
12. When satisfied that heater is operating properly, make sure to reset the control device to the proper setting and restore the fan and heater for normal type operation.

IMPORTANT: *Use care when troubleshooting this product. Limit exposure to potential hazards by following all recommended safety practices.*

1. Heater Housing: CHD-15 - [\(See Page 32.\)](#)
2. Heater Housing: CHD-30 and CHD-40 - [\(See Page 33.\)](#)
3. Propane Vapor Pipe Train: All Models - [\(See Page 34.\)](#)
4. Liquid Propane Pipe Train: All Models - [\(See Page 35.\)](#)
5. Natural Gas Pipe Train: CHD-15 - [\(See Page 36.\)](#)
6. Natural Gas Pipe Train: CHD-30 and CHD-40 - [\(See Page 37.\)](#)
7. LP Supply Pipe Train - [\(See Page 38.\)](#)
8. 3/4" High-Low Pipe Train Option - [\(See Page 39.\)](#)
9. 3/4" Modulating Pipe Train Option - [\(See Page 40.\)](#)
10. 1.0" Pipe Train Options: High-Low and Modulating - [\(See Page 41.\)](#)
11. Deluxe Heater Control Box - [\(See Pages 42-43.\)](#)

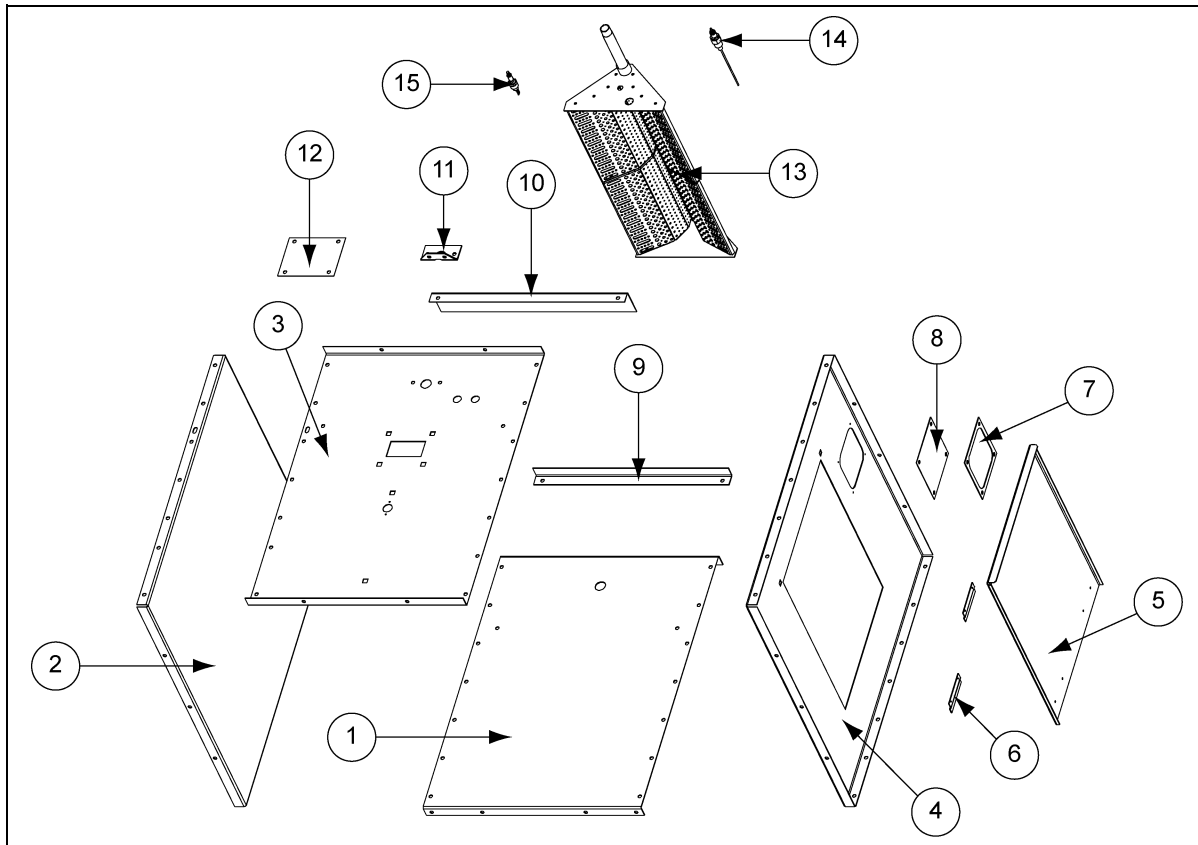
Heater Housing: CHD-15



Heater Housing: CHD-15 Parts List

Ref #	Part #	Description
1	HF-7653	Downwind Housing Bottom: 10-15
2	HF-7654	Downwind Housing Side: R.H. 10-15
3	HF-7652	Downwind Housing Top: 10-15
4	HF-7655	Downwind Housing Side: L.H. 10-15
5	HF-7854	Access Panel Downwind Heater - Blank
6	HF-7287	Access Panel Bracket - Downwind Heaters
7	HF-7379	Heater Cover Plate 1996<
8	HF-7380	Window Access 0.060 x 6 x 6 Plastic
9	HF-7662	Downwind Housing Profile Bottom: 10-15
10	HF-7661	Downwind Housing Profile Top: 10-15
11	401-5369-4	Burner Mounting Bracket - CFDH
12	HF-7796	Cover Plate - Downwind Vaporizer Hole
13	415-4312-5	Burner Sub-Assembly CFDH27
14	THH-4179	Flame Sensor 6" Long Rod
15	HH-1650	Spark Plug Auburn #I-31

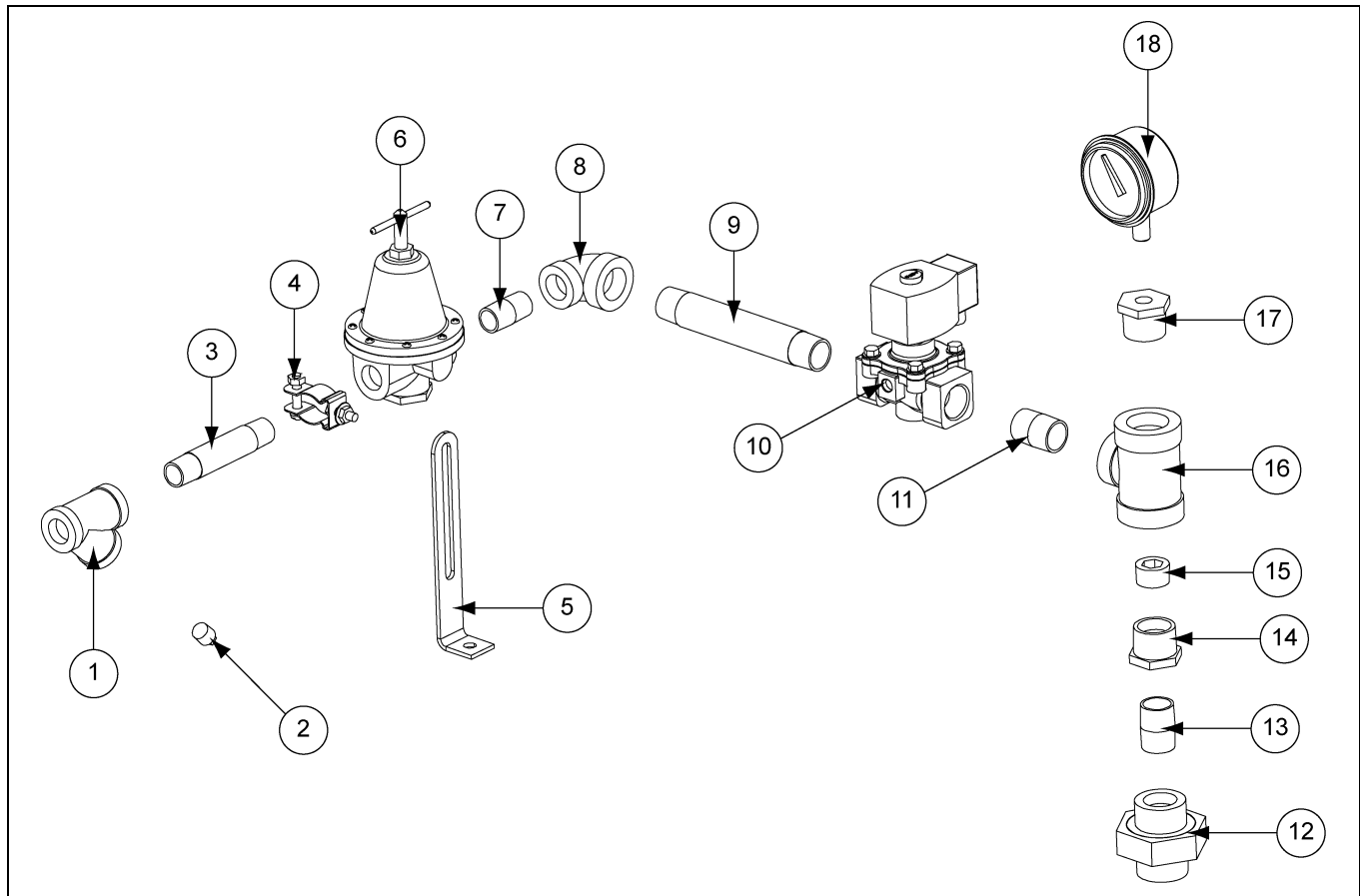
Heater Housing: CHD-30 and CHD-40



Heater Housing: CHD-30 Parts List			Heater Housing: CHD-40 Parts List		
Ref #	Part #	Description	Ref #	Part #	Description
1	HF-7781	Downwind Housing Bottom: 20-30	1	HF-7803	Downwind Housing Bottom: 40
2	HF-7783	Downwind Housing Side: R.H. 20-30/40	2	HF-7783	Downwind Housing Side: R.H. 20-30/40
3	HF-7780	Downwind Housing Top: 20-30	3	HF-7802	Downwind Housing Top: 40
4	HF-7784	Downwind Housing Side: L.H. 20-30/40	4	HF-7784	Downwind Housing Side: L.H. 20-30/40
5	HF-7854	Access Panel Downwind Heater - Blank	5	HF-7854	Access Panel Downwind Heater - Blank
6	HF-7287	Access Panel Bracket - Downwind Heaters	6	HF-7287	Access Panel Bracket - Downwind Heaters
7	HF-7379	Heater Cover Plate 1996<	7	HF-7379	Heater Cover Plate 1996<
8	HF-7380	Window Access 0.060 x 6 x 6 Plastic	8	HF-7380	Window Access 0.060 x 6 x 6 Plastic
9	HF-7786	Downwind Housing Profile Bottom: 20-30	9	HF-7805	Downwind Housing Profile Bottom: 40
10	HF-7785	Downwind Housing Profile Top: 20-30	10	HF-7804	Downwind Housing Profile Top: 40
11	401-5369-4	Burner Mounting Bracket - CFDH	11	401-5369-4	Burner Mounting Bracket - CFDH
12	HF-7796	Cover Plate - Downwind Vaporizer Hole	12	HF-7796	Cover Plate - Downwind Vaporizer Hole
13	415-4434-7	Burner Sub-Assembly CFDH30/33	13	415-4434-7	Burner Sub-Assembly CFDH30/33
14	THH-4179	Flame Sensor 6" Long Rod	14	THH-4179	Flame Sensor 6" Long Rod
15	HH-1650	Spark Plug Auburn #1-31	15	HH-1650	Spark Plug Auburn #1-31

8. Parts List

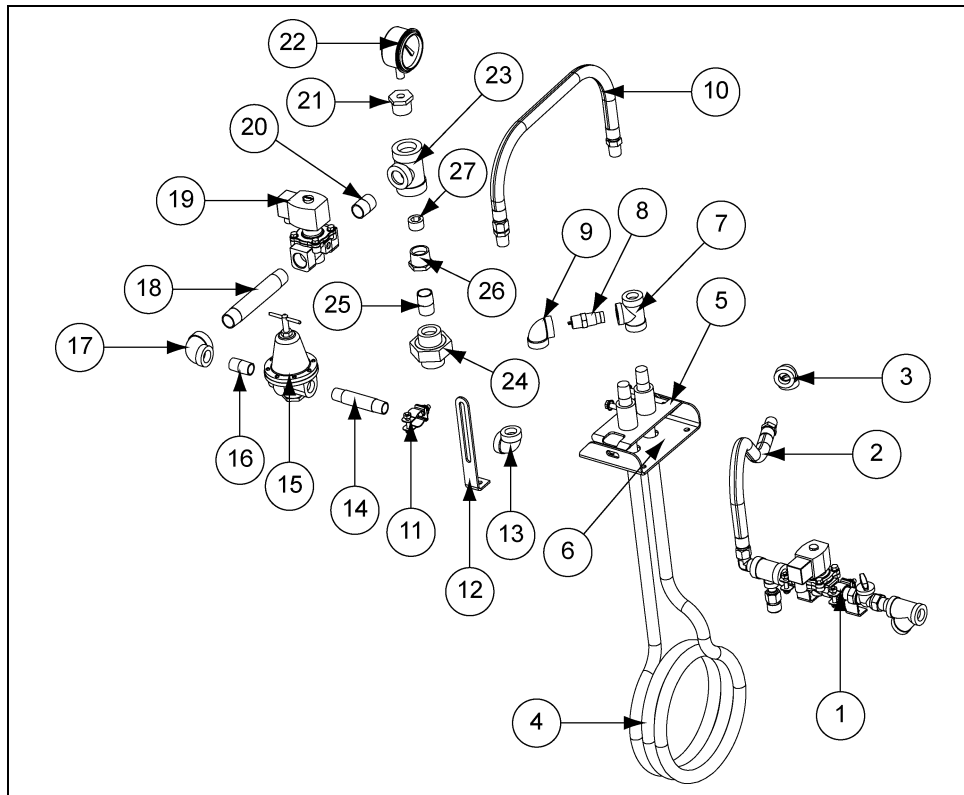
Propane Vapor Pipe Train: All Models



Propane Vapor Pipe Train: All Models Parts List

Ref #	Part #	Description	Ref #	Part #	Description
1	HH-1251	Strainer, 1/2" Y 250# WOG SCH 80	12	707-1175-9	Union, 3/4" SCH 40 Black
2	007-1747-0	Plug, Pipe 1/4"	13	THH-4121	Nipple, 3/4" Close SCH 40 Black
3	THH-4088	Nipple, 1/2" x 4" SCH 40 Black	14	HF-7794	Orifice Holder - Quad Heater - 3/4"
4	HH-1096	Clamp, 1/2" Conduit	15	HF-7701	Orifice Plug (3/4) Drill: 7/32" (CHD-15)
5	HF-7575	Pipe Train Bracket: Downwind Unipipe	15	HF-7749	Orifice Plug (3/4) Drill: 17/64" (CHD-30)
6	TFC-0023-50	Regulator, 1/2" NPT - CSA 50 PSI	15	HF-7809	Orifice Plug (3/4) Drill: 5/16" (CHD-40)
7	THH-4032	Nipple, 1/2" Close SCH 40 Black	16	007-1106-9	Tee, 1" x 1" x 3/4"
8	THH-4149	Elbow, 3/4"-1/2" Reduce SCH 40	17	THH-4001	Reducer, 1" x 1/4" Hex Bushing S40 BL
9	HH-7101	Nipple, 3/4" x 6" SCH 40 Black	18	HH-2984	Gauge, Pressure 0-30# LP
10	056-2223-8	Solenoid Valve 3/4" NPT 115V Din			
11	THH-4121	Nipple, 3/4" Close SCH 40 Black (CHD-15)			
11	HH-7102	Nipple, 3/4" x 2-3/4" SCH 40 Black (CHD-30)			
11	THH-4122	Nipple, 3/4" x 4-1/2" SCH 40 Black (CHD-40)			

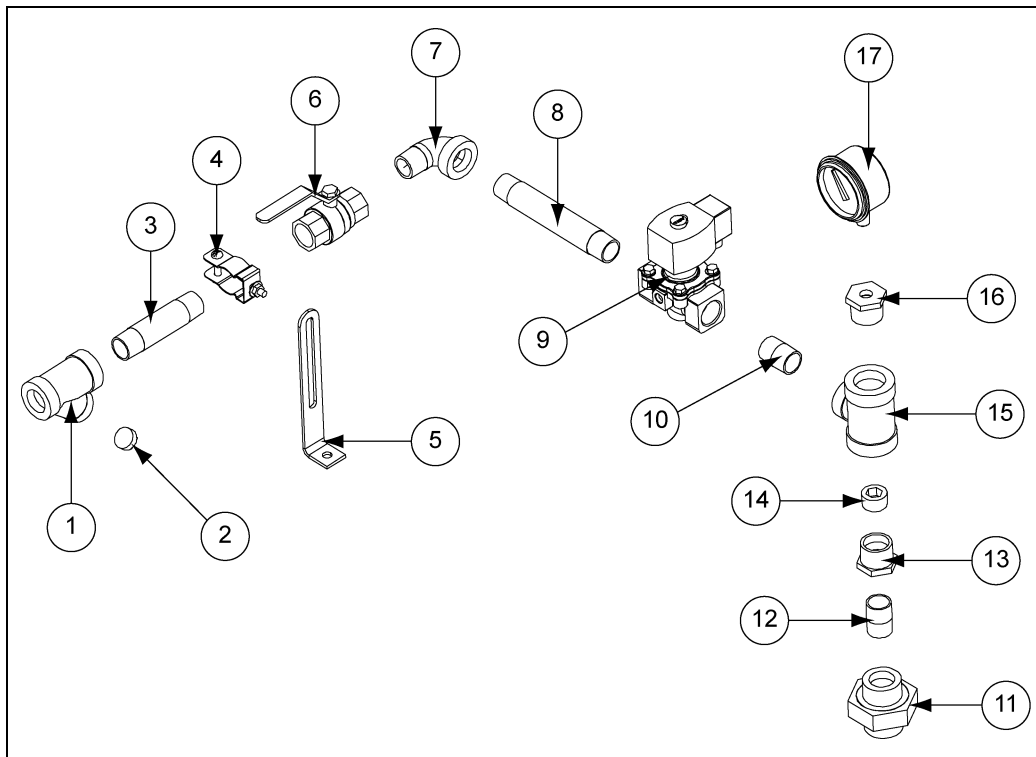
Liquid Propane Pipe Train: All Models



Liquid Propane Pipe Train: All Models Parts List

Ref #	Part #	Description	Ref #	Part #	Description
1	HF-7686	Pipe Train Assembly, LP Supply DW 04	17	THH-4149	Elbow, 3/4"-1/2" Reduce SCH 40
2	HF-7509	Hose, 1/2" x 18" LP Gas Assembly	18	D08-0020	Nipple, 3/4" x 6" SCH 80 Black
3	HH-4847	Elbow, 1/2"-90° SCH 80 Black	19	056-2223-8	Solenoid Valve 3/4" NPT 115V Din
4	CD-0197	Vaporizer Coil for Downwind Heaters	20	THH-4121	Nipple, 3/4" Close SCH 40 Black (CHD-15)
5	410-1783-1	Vaporizer Adjusting Weldment	20	HH-7102	Nipple, 3/4" x 2-3/4" SCH 40 Black (CHD-30)
6	HF-7795	Pivot Bracket: Downwind Vaporizer 04	20	THH-4122	Nipple, 3/4" x 4-1/2" SCH 40 Black (CHD-40)
7	THH-4058	Tee, 1/2" x 1/2" x 1/2" SCH 80 Black	21	THH-4001	Reducer, 1" x 1/4" Hex Bushing S40 BL
8	HH-7013	Switch, Screw-In Vapor High-limit	22	HH-2984	Gauge, Pressure 0-30# LP
9	THH-4071	Elbow, 1/2"-90° SCH 40 Black	23	007-1106-9	Tee, 1" x 1" x 3/4"
10	D07-0009	Hose, 3/8" x 24" LG LP Gas 350 Max	24	707-1175-9	Union, 3/4" SCH 40 Black
11	HH-1096	Clamp, 1/2" Conduit	25	THH-4121	Nipple, 3/4" Close SCH 40 Black
12	HF-7575	Pipe Train Bracket: Downwind Unipipe	26	HF-7794	Orifice Holder - Quad Heater - 3/4"
13	THH-4071	Elbow, 1/2"-90° SCH 40 Black	27	HF-7701	Orifice Plug (3/4) Drill: 7/32" (CHD-15)
14	THH-4088	Nipple, 1/2" x 4" SCH 40 Black	27	HF-7749	Orifice Plug (3/4) Drill: 17/64" (CHD-30)
15	TFC-0023-50	Regulator, 1/2" NPT - CSA 50 PSI	27	HF-7809	Orifice Plug (3/4) Drill: 5/16" (CHD-40)
16	THH-4032	Nipple, 1/2" Close SCH 40 Black			

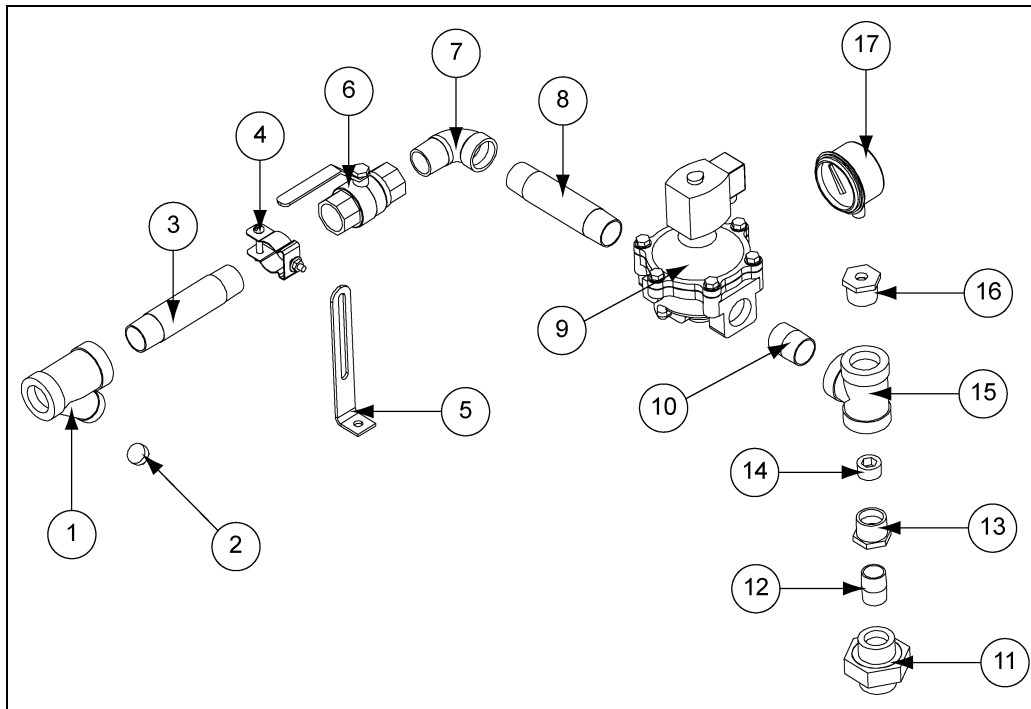
Natural Gas Pipe Train: CHD-15



Natural Gas Pipe Train: CHD-15 Parts List

Ref #	Part #	Description
1	D67-0008	Strainer, 3/4" Y 250# WOG SCH 80 Black
2	D07-0024	Plug, 1/2" Pipe Solid Black
3	D08-0018	Nipple, 3/4" x 4" SCH 40 Black
4	D62-0005	Clamp, 3/4" Conduit
5	HF-7575	Pipe Train Bracket: Downwind Unipipe
6	D58-0002	Valve, 3/4" NPT Ball Shut Off
7	THH-4066	Elbow, 3/4"-90° Street SCH 40 Black
8	HH-7101	Nipple, 3/4" x 6" SCH 40 Black
9	056-2223-8	Solenoid Valve 3/4" NPT 115V Din
10	THH-4121	Nipple, 3/4" Close SCH 40 Black
11	707-1175-9	Union, 3/4" SCH 40 Black
12	THH-4121	Nipple, 3/4" Close SCH 40 Black
13	HF-7794	Orifice Holder - Quad Heater - 3/4"
14	HF-7708	Orifice Plug (3/4) Drill: 21/64"
15	007-1106-9	Tee, 1" x 1" x 3/4"
16	THH-4001	Reducer, 1" x 1/4" Hex Bushing S40 BL
17	D08-0022	Gauge, Pressure 0-15#

Natural Gas Pipe Train: CHD-30 and CHD-40

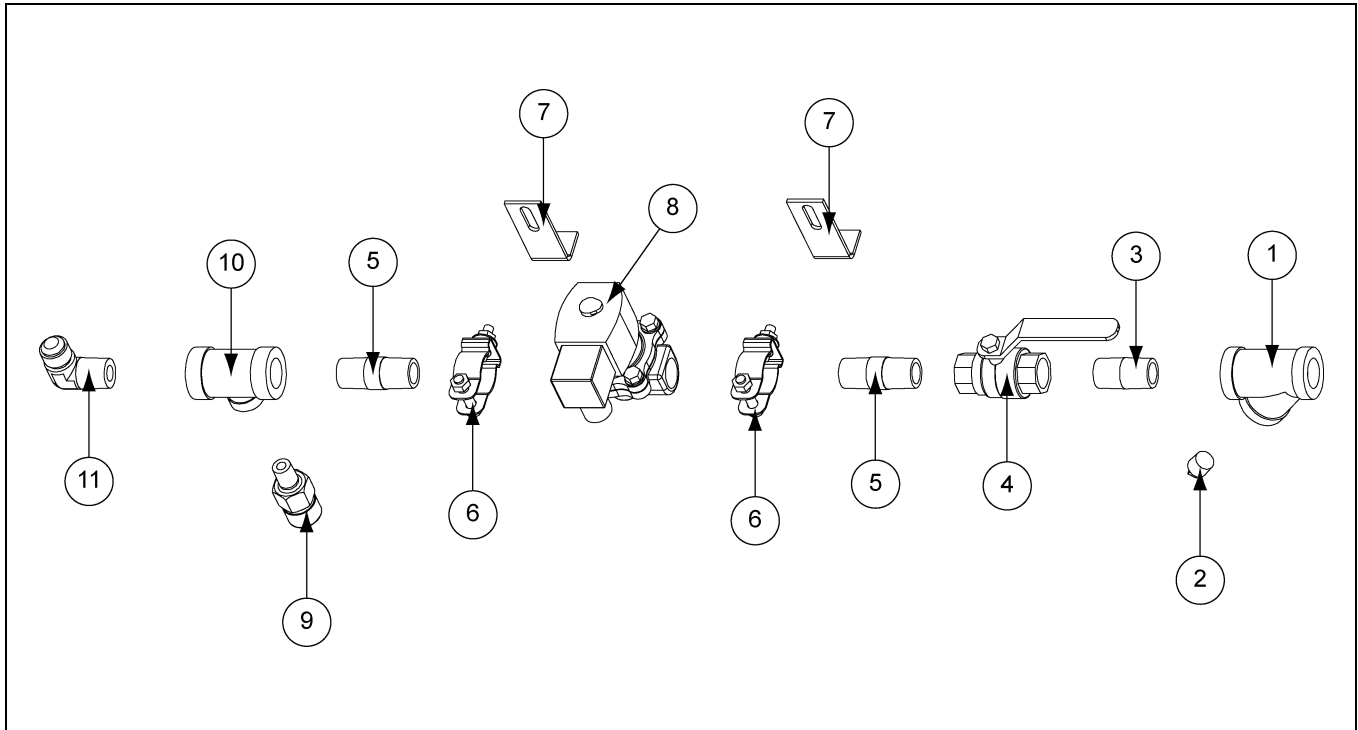


Natural Gas Pipe Train: CHD-30 and CHD-40 Parts List

Ref #	Part #	Description
1	TF-1283	Strainer, 1" Y
2	D07-0024	Plug, 1/2" Pipe Solid Black
3	THH-4059	Nipple, 1" x 5-1/2" SCH 40 Black
4	THH-4170	Clamp, 1" Conduit
5	HF-7575	Pipe Train Bracket: Downwind Unipipe
6	TFC-0093	Valve, 1" NPT Bronze Ball - CGA
7	THH-4164	Elbow, 1"-90° Street SCH 40 Black
8	THH-4059	Nipple, 1" x 5-1/2" SCH 40 Black (CHD-30)
8	007-1110-1	Nipple, 1" x 7" (CHD-40)
9	056-2224-6	Solenoid Valve 1" NPT 115V Din
10	THH-4117	Nipple, 1" Close SCH 40 Black
11	707-1175-9	Union, 3/4" SCH 40 Black
12	THH-4121	Nipple, 3/4" Close SCH 40 Black
13	HF-7794	Orifice Holder - Quad Heater - 3/4"
14	HF-7750	Orifice Plug (3/4) Drill: 25/64" (CHD-30)
14	HF-7810	Orifice Plug (3/4) Drill: 7/16" (CHD-40)
15	THH-4137	Tee, 1" x 1" x 1" NPT SCH 40 Black
16	THH-4001	Reducer, 1" x 1/4" Hex Bushing S40 BL
17	D08-0022	Gauge, Pressure 0-15#

8. Parts List

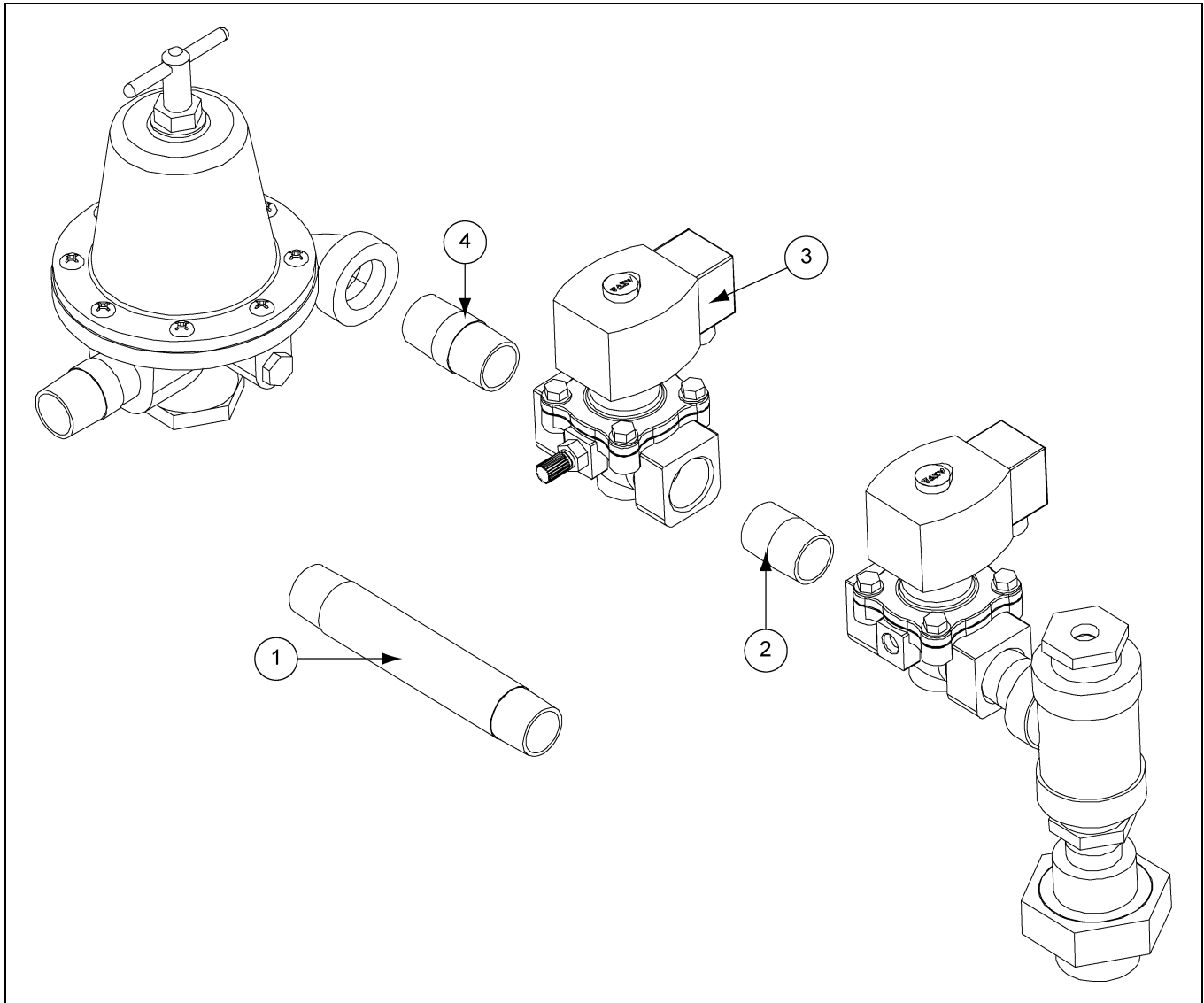
LP Supply Pipe Train



LP Supply Pipe Train Parts List

Ref #	Part #	Description
1	HH-1251	Strainer, 1/2" Y 250# WOG SCH 80
2	007-1747-0	Plug, Pipe 1/4"
3	D07-0019	Nipple, 1/2" x 1-1/2" SCH 80 Black
4	007-1226-5	Ball Valve 1/2" w/ Lever Handle
5	HF-7586	Nipple, 1/2" x 2" SCH 80 Black
6	HH-1096	Clamp, 1/2" Conduit
7	HF-1026	Pipe Train Bracket: Vane Axial Heaters
8	TFC-0100	Valve, 1/2" NPT Solenoid LP w/ Din
9	TFC-0027	Valve, 1/4" NPT 250 PSI Relief
10	HH-4846	Tee, 1/2" x 1/2" x 1/4" SCH 80 Black
11	HH-1932	Elbow, 1/2" Pipe/1/2" Flare Brass

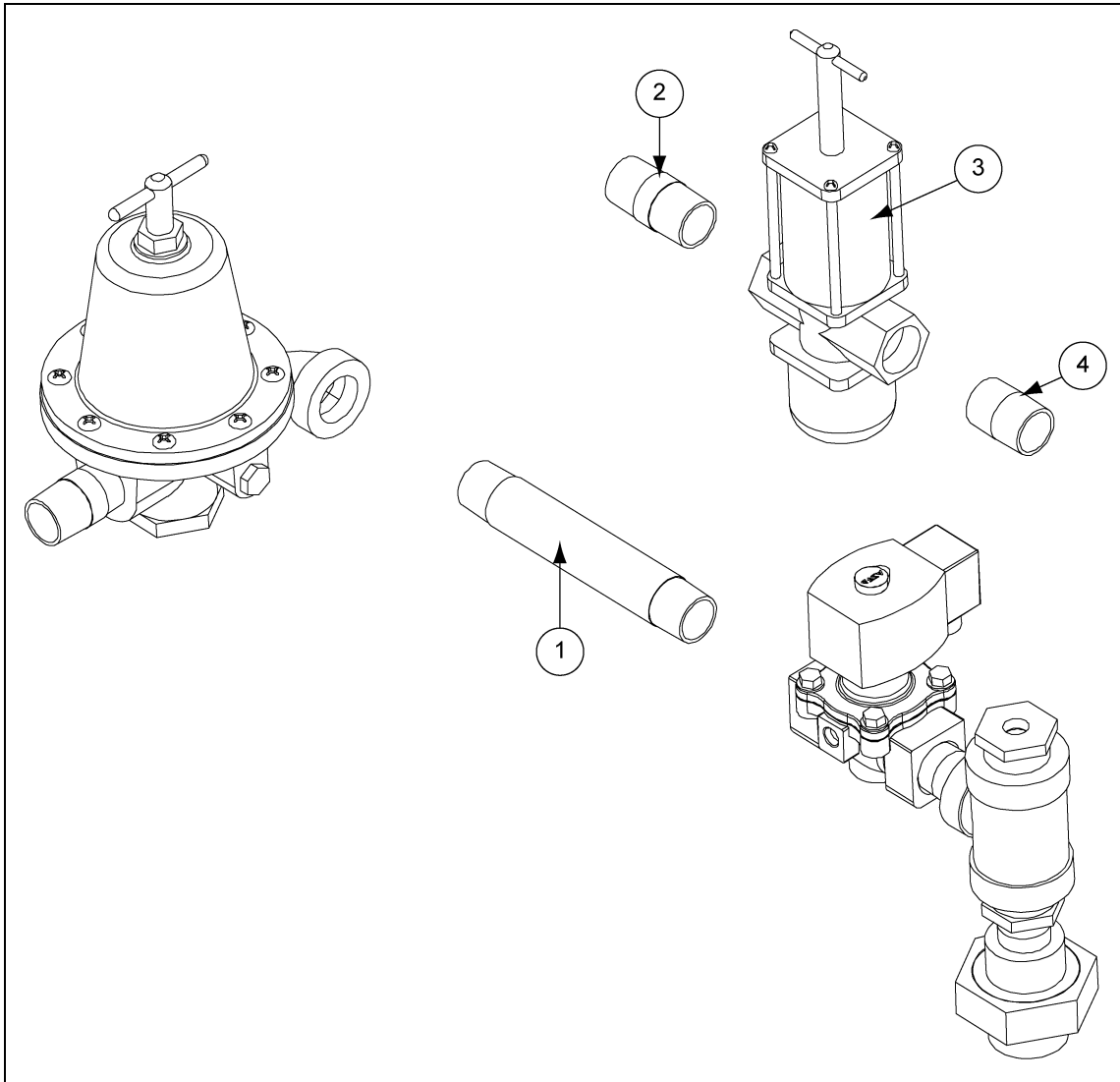
3/4" High-Low Pipe Train Option



3/4" High-Low Pipe Train Option Parts List

Ref #	Part #	Description
1	D08-0020	Nipple, 3/4" x 6" SCH 40 Black
2	THH-4125	Nipple, 3/4" x 2" SCH 40 Black
3	056-2228-7	Solenoid Valve 3/4" NPT 115V Bypass
4	THH-4121	Nipple, 3/4" Close SCH 40 Black

3/4" Modulating Pipe Train Option



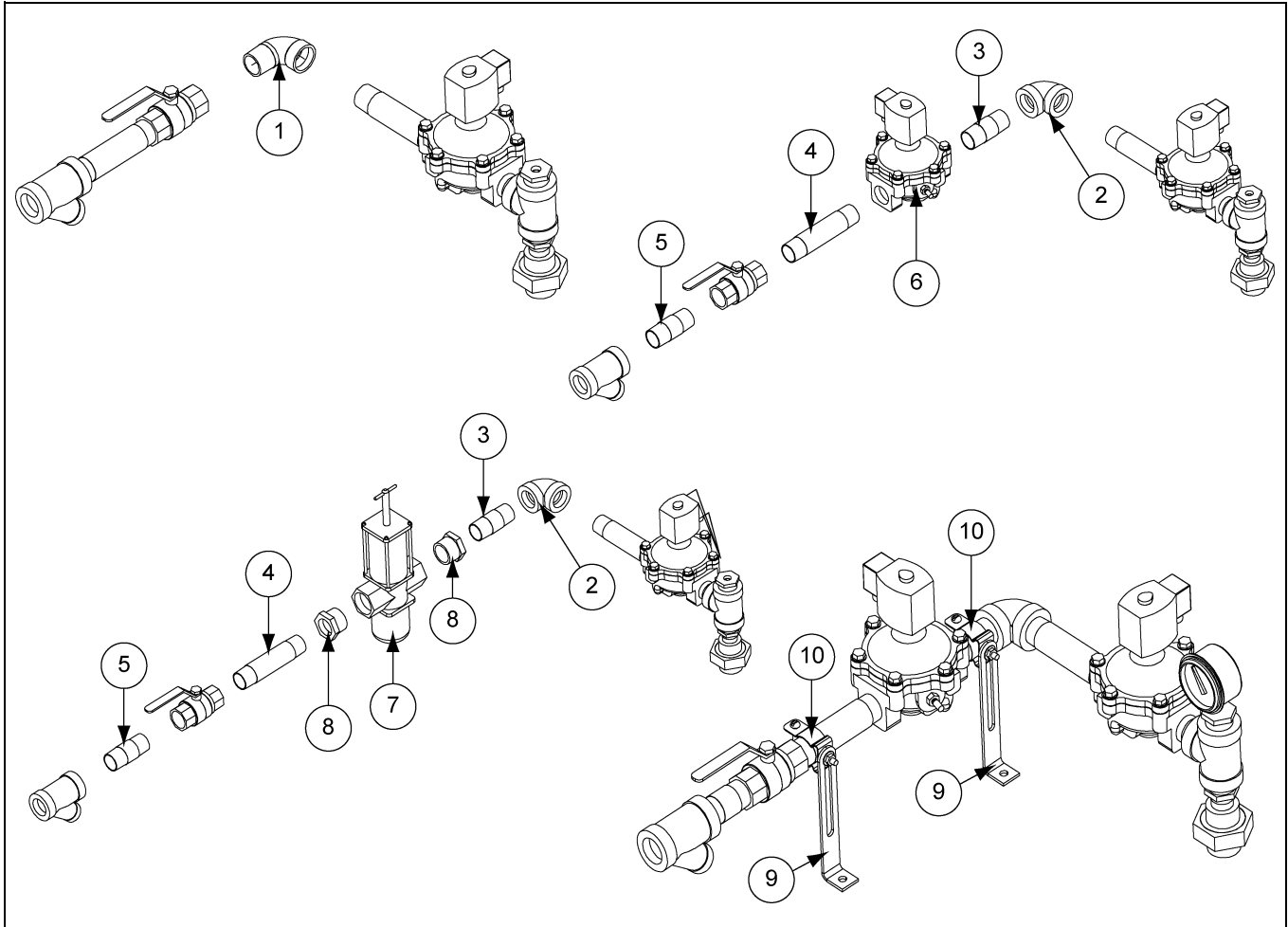
3/4" Modulating Pipe Train Option Parts List

Ref #	Part #	Description
1	THH-4164	Elbow, 1"-90° Street SCH 40 Black
2	THH-4115	Elbow, 1"-90° SCHED SCH 40 Black
3	THH-4151	Nipple, 1" x 3" SCH 40 Black
4	THH-4059	Nipple, 1" x 5-1/2" SCH 40 Black

High-Low or Modulating Valves can be ordered factory installed or added in the field. Field installation requires the removal of the long pipe nipple (See Ref #1 [on Page 39](#)). Once removed, the components for the appropriate valve should be added in the same location. Pipe sealant should always be used to prevent leaks.

1.0" Pipe Train Options: High-Low and Modulating

High-Low or Modulating Valves can be ordered factory installed or added in the field. Field installation requires the removal of the 1" 90° street elbow (Ref #1). Once removed, the components for the appropriate valve should be added in the same location. 1.0" Pipe train options will require additional support brackets: HF-7575 and THH-4170. Pipe sealant should always be used to prevent leaks.

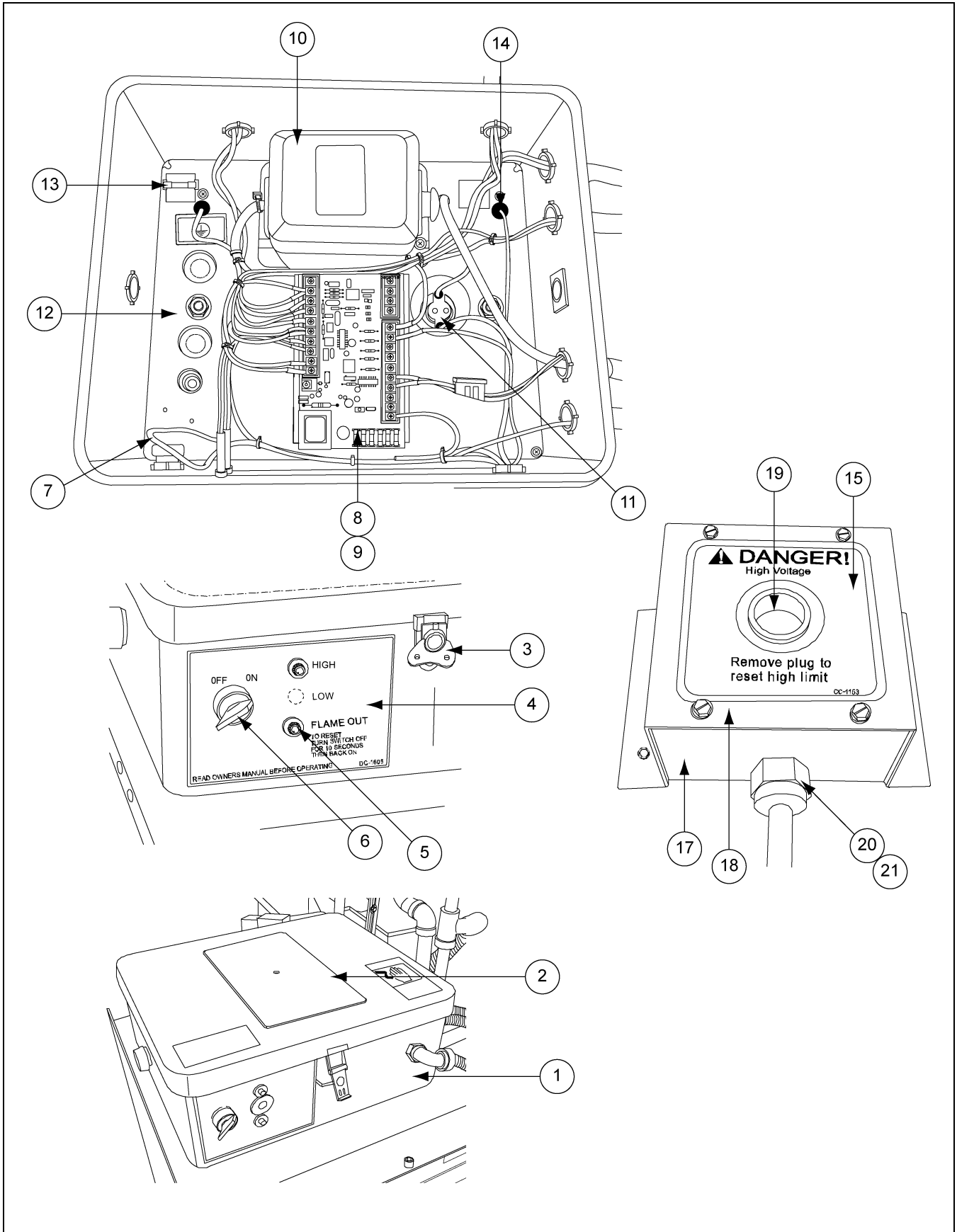


1.0" Pipe Train Options: High-Low and Modulating Parts List

Ref #	Part #	Description
1	THH-4164	Elbow, 1"-90° Street SCH 40 Black
2	THH-4115	Elbow, 1"-90° SCHED SCH 40 Black
3	THH-4151	Nipple, 1" x 3" SCH 40 Black
4	THH-4059	Nipple, 1" x 5-1/2" SCH 40 Black
5	THH-4151	Nipple, 1" x 3" SCH 40 Black
6	056-2230-3	Solenoid Valve 1" NPT 115V w/ Bypass
7	HF-7847	Valve, Mod 1-1/4" 90/210F 15' Cap
8	THH-4083	Reducer, 1-1/4 -1" Hex Bushing SCH
9	HF-7575	Pipe Train Bracket: Downwind Unipipe
10	THH-4170	Clamp, 1" Conduit

8. Parts List

Deluxe Heater Control Box



Deluxe Heater Control Box Parts List

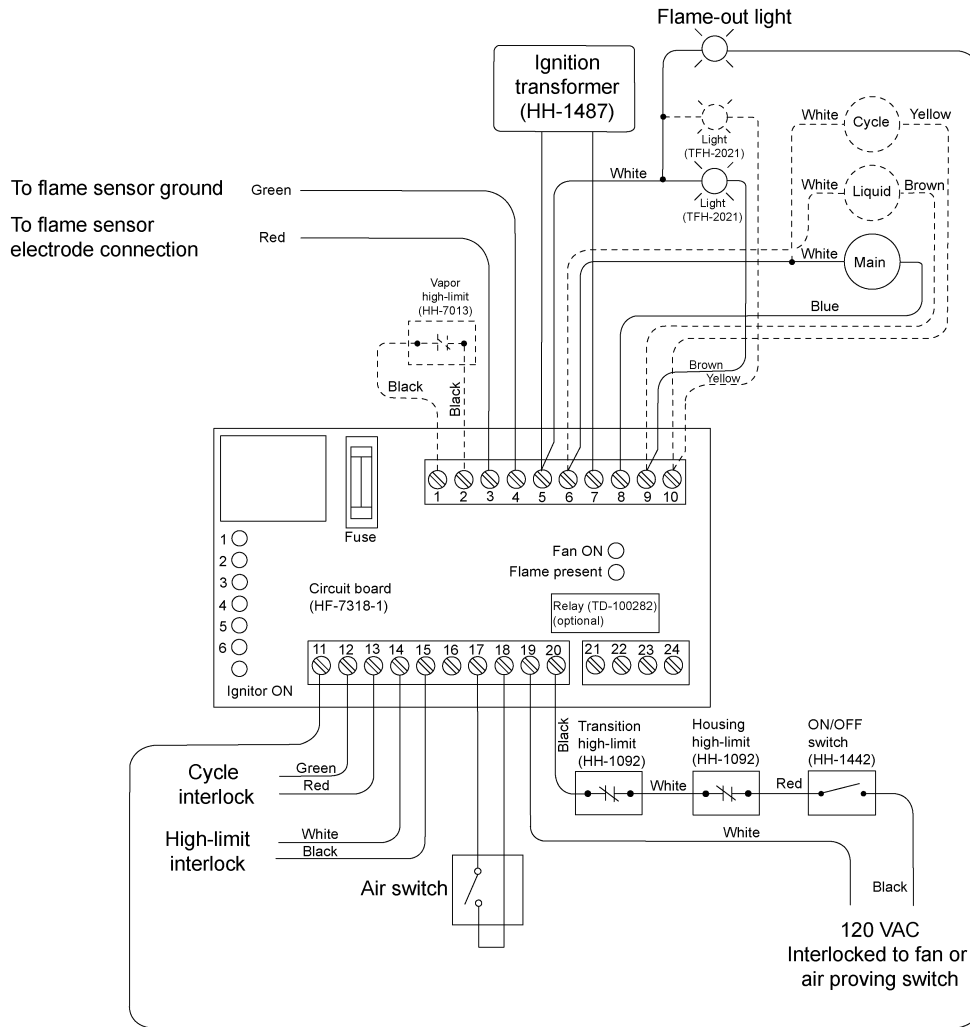
Ref #	Part #	Description
1	HF-7719	Downwind Heater Box - CNC OPS
2	069-1376-8	Control Box Lid - Poly Blank
3	D03-0696	Latch, Farm Fans Control Box
4	DC-1695	Decal, Heater Plastic Control Box Deluxe
5	90-0009	Lamp, Oil Tight 1/4" TAB 120V
6	HF-7696	Switch 2 Position Selector: Lever
7	D63-0006	Block, Contact N.O.
8	HF-7318-1	Deluxe Circuit Board
9	HF-7211	Snap Track 4" x 6" (Circuit Board)
10	HH-1487	Transformer Single Pole 120V
11	HH-1092	Switch, High-Limit 180°
12	HF-7698	Backing Plate - Heater Controls
13	FH-7404	Fuse, 2 Amp 1/4" x 1-1/4" Slow Blow
14	E160-1137	Lug Ground, #TA-2 (CSA)
15	DC-1165	Decal, Danger Transition High-Limit
16	HF-7439	Switch, High-Limit 250° (Not Shown)
17	HF-7454	High-Limit Box Body - Transition High-Limit
18	HF-7455	High-Limit Box Lid - Transition High-Limit
19	HF-7414	Plug, Plastic 7/8" Recessed
20	FH-1310	Connector, Cord HEYCO #3231
21	FH-1309	Lock Nut 1/2" with Pipe Threads

9. Test Fire Procedure

Test Firing Deluxe Burner Control

1. Turn ON power and fuel to the fan and heater. Set the controlling thermostat to call for heat.
2. Start fan and move heater switch to the “ON” position.
 - a. The “FAN ON” indicator light on the board should now be lit.
 - b. If light is not ON, confirm 120V at terminals 19 and 20. If no power exists, check for power at the fuse in the fan control box and all safety high-limit switches. Make the needed repairs to restore power to the terminals 19 and 20.
 - c. If power exists at terminals 19 and 20, be sure the circuit between 17 and 18 for the air switch is closed.
3. With the “FAN ON” indicator lit, the troubleshooting lights 1 through 5 should be ON at the end of a 20 second purge cycle. The “IGNITOR ON” indicator will now light.
4. Heater should ignite, and “FLAME PRESENT” indicator should be lit. If flame is present and light not ON. Adjust sensor into flame until light is ON when flame is burning. It may be necessary to adjust sensor after changing gas pressure settings.
5. If heater does not light, follow the troubleshooting lights on the wiring schematic decal and correct faults. Be aware that light #1 relates to the fuse on the board and not the fuse in the fan control box. If the fuse in the fan box is blown, no lights on the board will be ON.
6. Cycle the controlling thermostat to ensure the heater responds to the call for heat. If the unit is HIGH-LOW fire, the #6 light will indicate during high-fire.
7. Heater is now ready for normal operation. Set the desired temperature on the thermostat and check fuel pressure settings.

10. Deluxe Heater Wiring Diagram



● Indicates light ON ○ Indicates light OFF

Indication	Possible cause	Possible solution
○ ○ ○ ○ ○ ○ 1 2 3 4 5 6	Bad ON/OFF switch Heater housing high-limit Transition high-limit No power to heater	Replace switch Reset or replace high-limit Reset or replace high-limit Check heater
● ○ ○ ○ ○ ○ 1 2 3 4 5 6	Blown fuse	Replace fuse
● ● ○ ○ ○ ○ 1 2 3 4 5 6	Flame sensor (if flame present light ON) Control board Air switch (if fan ON light not ON)	Clean or replace flame sensor Replace control board Check air switch
● ● ● ○ ○ ○ 1 2 3 4 5 6	Vaporizer high-limit	Adjust vaporizer coil replace vapor high-limit
● ● ● ● ○ ○ 1 2 3 4 5 6	Humidistat/Thermostat	Temperature reached replace thermostat or humidistat
● ● ● ● ● ○ 1 2 3 4 5 6	Spark plug No fuel to burner Bad solenoid	Clean or replace spark plug Check fuel supply Replace solenoid

● ● ● ● ● ○ Wait for 20 second purge delay to troubleshoot.
1 2 3 4 5 6 Indicating lights shown on left should be lit when unit is operating properly.

DC-1161

11. Miscellaneous Parts by Description

Part #	Description	Part #	Description
HF-7200	250° Bin High-Limit Assembly	HF-7719	Downwind Heater Box - CNC OPS
HF-7431	Access Panel Assembly Downwind Heater	HF-7653	Downwind Housing Bottom: 10-15
HF-7287	Access Panel Bracket - Downwind Heaters	HF-7781	Downwind Housing Bottom: 20-30
HF-7288	Access Panel Downwind Heater	HF-7803	Downwind Housing Bottom: 40
D03-0099	Adapter Tab 0.187" x 0.187"	HF-7662	Downwind Housing Profile Bottom: 10-15
HF-7698	Backing Plate - Heater Controls	HF-7786	Downwind Housing Profile Bottom: 20-30
D63-0006	Block, Contact N.O.	HF-7805	Downwind Housing Profile Bottom: 40
S-6606	Flange Bolt 5/16"-18 x 3/4" ZN Grade 5	HF-7661	Downwind Housing Profile Top: 10-15
S-1101	Bolt, HHCS 1/4"-20 x 1/2" ZN Grade 2	HF-7785	Downwind Housing Profile Top: 20-30
756-1485-9	Boot - For Flame Rod and Igniter-A	HF-7804	Downwind Housing Profile Top: 40
HF-7665	Burner Mounting Grip: Downwind Heater	FH-7050	Elbow, 3/8" 90° PVC w/ Nut
415-4312-5	Burner Sub-Assembly CFDH27	HF-7655	Downwind Housing Side: L.H. 10-15
415-4434-7	Burner Sub-Assembly CFDH30/33	D03-0696	Latch, Farm Fans Control Box
HH-1096	Clamp, 1/2" Conduit	HF-7784	Downwind Housing Side: L.H. 20-30/40
HF-7710	Conduit Assembly - Downwind Flame Rod Wire	HF-7654	Downwind Housing Side: R.H. 10-15
415-4222-6	Conduit Assembly - Downwind Heater to Fan	HF-7783	Downwind Housing Side: L.H. 20-30/40
HF-7709	Conduit Assembly - Downwind Ignition Wire	FH-7404	Fuse, 2 Amp 1/4" x 1-1/4" Slow Blow
HF-7723	Conduit Assembly - Liquid Solenoid w/ Din DW	HF-7652	Downwind Housing Top: 10-15
HF-7722	Conduit Assembly - Main Solenoid w/ Din DW	HF-7780	Downwind Housing Top: 20-30
FH-1310	Connector, Cord HEYCO #3231	HF-7802	Downwind Housing Top: 40
069-1376-8	Control Box Lid - Poly Blank	025-1203-6	Plug, Hole - 7/8" Diameter Liquid Tight
HF-7694	Control Box Sub-Assembly: Downwind Deluxe	THH-4071	Elbow, 1/2"-90° SCH 40 Black
HF-7796	Cover Plate - Downwind Vaporizer Hole	HH-4847	Elbow, 1/2"-90° SCH 80 Black
DC-889	Decal, Danger High Voltage	THH-4153	Elbow, 1" x 1/2" - 90° Reducing SCH 40
420-1422-5	Decal, 115 Volt 1 Phase	FH-1309	Lock Nut 1/2" with Pipe Threads
DC-113	Decal, Air Flow	THH-4149	Elbow, 3/4"-1/2" Reduce SCH 40
DC-1224	Decal, Danger High Voltage (LG)	90-0009	Lamp, Oil Tight 1/4" TAB 120V
DC-1254	Decal, Ground Lug 24 Per Sheet	E160-1137	Lug Ground, #TA-2 (CSA)
DC-108	Decal, High-Limit Button	THH-4179	Flame Sensor 6" Long Rod
DC-1718	Decal, Warning Heater Fire	S-2052	Foam Strip 1/8" Thread x 1/2" Wide
DC-1559	Decal, Warning: DC-1225/DC-1227	025-1202-8	Gasket - Adapter Plate/Motor C
DC-1170	Decal, Deluxe Heater Wiring	HH-2984	Gauge, Pressure 0-30# LP
DC-1702	Decal: Caution Use TSTAT w/ Heater	HF-7379	Heater Cover Plate 1996<
FH-7038	Fitting, Sealtite PVC 3/8"	HF-7509	Hose, 1/2" x 18" LP Gas Assembly
DC-1695	Decal, Heater Plastic Control Box Deluxe	D07-0009	Hose, 3/8" x 24" LG LP Gas 350 Max
HF-7318-1	Deluxe Circuit Board	HH-7014	Jumper J6-2 Terminal Strip
FH-7049	Adapter, Connector PVC 3/8" Straight w/ Nut	PNEG-588-04	Manual, Heater Deluxe Downwind 04
006-1354-7	Din Connector - 1/2" NPT	090-1705-4	Screw, MS #8-32 x 3/8" Phillips PHSEMS
HH-7046	Crimp, Disconnect 0.187" Female	007-1110-1	Nipple, 1" x 7"

11. Miscellaneous Parts by Description

Part #	Description
090-1701-3	Screw, MS #10-24 x 1/2" PHS ZN
THH-4117	Nipple, 1" Close SCH 40 Black
THH-4059	Nipple, 1" x 5-1/2" SCH 40 Black
THH-4032	Nipple, 1/2" Close SCH 40 Black
090-1699-9	Rivet, Pop 1/8" Diameter x 0.775" Long
THH-4088	Nipple, 1/2" x 4" SCH 40 Black
THH-4121	Nipple, 3/4" Close SCH 40 Black
HH-7098	Nipple, 3/4" x 12" SCH 40 Black
D08-0020	Nipple, 3/4" x 6" SCH 40 Black
S-7215	Flange Nut 1/4"-20 ZINC
S-280	Screw, SDS #10-16 x 5/8" HWH ZN
S-968	Flange Nut 3/8"-16 ZN Grade 5
S-2786	Screw, TCSF #8-32 x 3/8" RHP ZN
S-3611	Flange Nut 5/16-18 ZN YDP
S-8927	Jam Nut M14 x 1-1/4" Black
07098556	Shroud 16" Motor Cord
HF-7794	Orifice Holder- Quad Heater - 3/4"
HF-7749	Orifice Plug (3/4) Drill: 17/64"
006-1363-8	Sealing Washer 0.85 I.D. Black
HF-7708	Orifice Plug (3/4) Drill: 21/64"
HF-7750	Orifice Plug (3/4) Drill: 25/64"
HF-7809	Orifice Plug (3/4) Drill: 5/16"
HH-1106	Terminal, 3/16" Eyelet
HF-7211	Snap Track 4" x 6" (Circuit Board)
HF-7810	Orifice Plug (3/4) Drill: 7/16"
S-4764	Spade Terminal MV14-6FBX Fork
HF-7701	Orifice Plug (3/4) Drill: 7/32"
S-7598	Paint, Black Spray
HF-7696	Switch 2 Position Selector: Lever
007-1747-0	Plug, Pipe 1/4"
HF-7686	Pipe Train Assembly: LP Supply DW 04
HF-7575	Pipe Train Bracket: Downwind Unipipe
HF-1026	Pipe Train Bracket: Vane Axial Heaters
WR-18WHT	Wire 18 Gauge White Stranded
HF-7795	Pivot Bracket: Downwind Vaporizer 04
045-1068-1	Terminal Strip Assembly 20A 2 Position W
THH-4001	Reducer, 1" x 1/4" Hex Bushing S40 BL
TFC-0023-50	Regulator, 1/2" NPT - CSA 50 PSI
090-1709-6	Retainer Nut 5/16"-18 x 0.120" ZN

Part #	Description
S-7192	Screw, MS #8-32 x 5/8" PHP ZN
D03-0247	Wire Tie 5" Panduit #PLT 1.5M-M
WR-18GRN/YLW	Wire, 18 Gauge Green/Yellow Stranded
07098556	Shroud 16" Motor Cord
CH-6873	Silicone Cartridge Clear RTV
WR-18BLU	Wire, 18 Gauge Blue Stranded
WR-18FPGR	Wire, 18 Gauge GR Teflon Flame SNS
WR-18GRN/YLW	Wire, 18 Gauge Green/Yellow Stranded
WR-18FPRD	Wire, 18 Gauge RD Teflon Flame SNS
WR-7MM	Wire, 7 MM Silicone Ignitor
E105-1102	Wire Kit - VA/DW Heaters Deluxe
D02-0039	Wire Tie Anchors
E305-0282	WR 126" (18 Black) 1/4 Spade/3/8"
HH-1650	Spark Plug Auburn #I-31
HH-1251	Strainer, 1/2" Y 250# WOG SCH 80
DC-1461	Decal, Tag Attention Pressure Gauges
HH-1092	Switch, High-Limit 180°
HH-7013	Switch, Screw-In Vapor High-Limit
707-1175-9	Union, 3/4" SCH 40 Black
007-1106-9	Tee, 1" x 1" x 3/4"
THH-4137	Tee, 1" x 1" x 1" NPT SCH 40 Black
THH-4058	Tee, 1/2" x 1/2" x 1/2" SCH 80 Black
HH-1487	Transformer Single Pole 120V
HF-7705	Piping Sub-Assembly 1.0 (CHD-30)
HF-7808	Piping Sub-Assembly 1.0 (CHD-40)
HF-7704	Piping Sub-Assembly 3/4 (CHD-15)
056-2224-6	Solenoid Valve 1" NPT 115V Din
056-2223-8	Solenoid Valve 3/4" NPT 115V Din
410-1783-1	Vaporizer Adjusting Weldment
CD-0197	Vaporizer Coil for Downwind Heaters
S-3674	Flat Washer #10 SAE ZN
HF-7380	Window Access 0.060 x 6 x 6 Plastic
WR-18BRN	Wire 18 Gauge Brown Stranded
WR-18YLW	Wire 18 Gauge Yellow Stranded

NOTES

Limited Warranty — N.A. Grain Products

The GSI Group, LLC. ("GSI") warrants products which it manufactures, to be free of defects in materials and workmanship under normal usage and conditions for a period of 12 months from the date of shipment (or, if shipped by vessel, 14 months from the date of arrival at the port of discharge). If, in GSI's sole judgment, a product is found to have a defect in materials and/or workmanship, GSI will, at its own option and expense, repair or replace the product or refund the purchase price. This Limited Warranty is subject to extension and other terms as set forth below.

Warranty Enhancements: The warranty period for the following products is enhanced as shown below and is in lieu of (and not in addition to) the above stated warranty period. (Warranty Period is from date of shipment.)

	Product	Warranty Period
Storage	Grain Bin Structural Design • Sidewall, roof, doors, platforms and walkarounds • Flooring (when installed using GSI specified floor support system for that floor) • Hopper tanks (BFT, GHT, NCHT, and FCHT)	5 Years
Conditioning	Dryer Structural Design – (Tower, Portable and TopDry) • Includes (frame, portable dryer screens, ladders, access doors and platforms)	5 Years
	All other Dryer parts including: • Electrical (controls, sensors, switches and internal wiring)	2 Years
	All Non-PTO Driven Centrifugal and Axial Fans	3 Years
	Bullseye Controllers	2 Years
Material Handling	Bucket Elevators Structural Design	5 Years
	Towers Structural Design	5 Years
	Catwalks Structural Design	5 Years
	Accessories (stairs, ladders and platforms) Structural Design	5 Years

Conditions and Limitations:

THERE ARE NO WARRANTIES THAT EXTEND BEYOND THE LIMITED WARRANTY DESCRIPTION SET FORTH HEREIN; SPECIFICALLY, GSI DISCLAIMS ANY AND ALL OTHER WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE IN CONNECTION WITH: (I) ANY PRODUCT MANUFACTURED OR SOLD BY GSI, OR (II) ANY ADVICE, INSTRUCTION, RECOMMENDATION OR SUGGESTION PROVIDED BY AN AGENT, REPRESENTATIVE OR EMPLOYEE OF GSI REGARDING OR RELATED TO THE CONFIGURATION, INSTALLATION, LAYOUT, SUITABILITY FOR A PARTICULAR PURPOSE, OR DESIGN OF SUCH PRODUCTS.

The sole and exclusive remedy for any claimant is set forth in this Limited Warranty and shall not exceed the amount paid for the product purchased. This Warranty only covers the value of the warranted parts and equipment, and does not cover labor charges for removing or installing defective parts, shipping charges with respect to such parts, any applicable sales or other taxes, or any other charges or expenses not specified in this Warranty. GSI shall not be liable for any other direct, indirect, incidental or consequential damages, including, without limitation, loss of anticipated profits or benefits. Expenses incurred by or on behalf of a claimant without prior written authorization from the GSI warranty department shall not be reimbursed. This warranty is not transferable and applies only to the original end-user. GSI shall have no obligation or responsibility for any representations or warranties made by or on behalf of any dealer, agent or distributor. Prior to installation, the end-user bears all responsibility to comply with federal, state and local codes which apply to the location and installation of the products.

This Limited Warranty extends solely to products sold by GSI and does not cover any parts, components or materials used in conjunction with the product, that are not sold by GSI. GSI assumes no responsibility for claims resulting from construction defects, unauthorized modifications, corrosion or other cosmetic issues caused by storage, application or environmental conditions. Modifications to products not specifically delineated in the manual accompanying the product at initial sale will void all warranties. This Limited Warranty shall not extend to products or parts which have been damaged by negligent use, misuse, alteration, accident or which have been improperly/inadequately maintained.

Notice Procedure:

In order to make a valid warranty claim a written notice of the claim must be submitted, using the RMA form, within 60 days of discovery of a warrantable nonconformance. The RMA form is found on the OneGSI portal.

Service Parts:

GSI warrants, subject to all other conditions described in this Warranty, Service Parts which it manufactures for a period of 12 months from the date of purchase unless specified in Enhancements above.

This equipment shall be installed in accordance with the current installation codes and applicable regulations, which should be carefully followed in all cases. Authorities having jurisdiction should be consulted before installations are made.

G S I G R O U P



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